MAP: CANADA'S HIGHEST PEAKS

CELEBRATING 50 YEARS OF THE BEAVER

CANADIAN Geographic

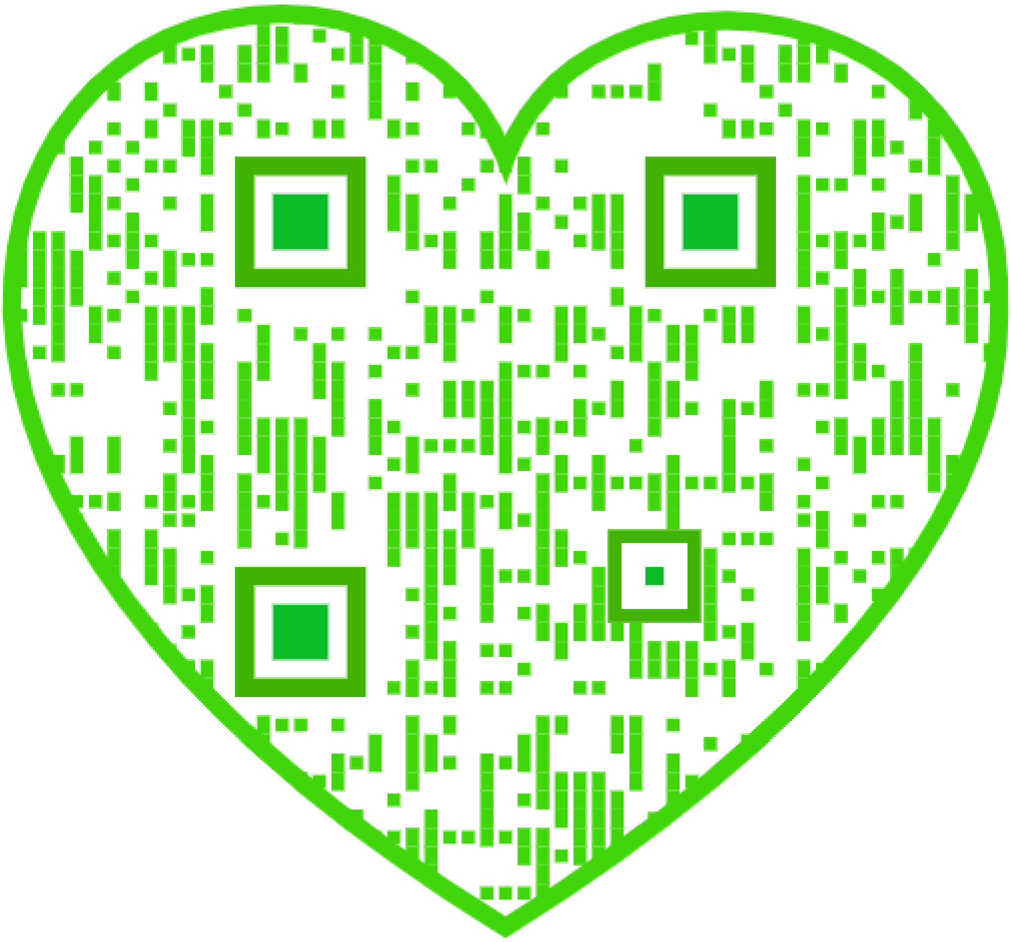
BEST SHOTS FROM OUR ANNUAL PHOTO COMPETITION

JASPER JOURNEY TO MALIGNE LAKE

VANCOUVER'S SANDPIPER STOPOVER

+

THE POWERFUL DOC *SUGARCANE*,
LAND RESTORATION IN NEWFOUNDLAND,
THE GREAT CANADA FLAG DEBATE,
ROBERTA BONDAR AND MORE!



ALAIN HUBERT, 2007 POLAR
EXPLORER AND MOUNTAINEER

HAROUN TAZIEFF, 1963
PIONEERING VOLCANOLOGIST

FRANCESCO
SAURO, 2014
SUBTERRANEAN
EXPLORER

WHAT IS THE QUEST?

Refined. Polished. Built for the extreme. Its case, bezel and bracelet are made in Oystersteel, an alloy specifically harnessed to withstand the sheer strength of Nature, and keep pace with the pioneers who breached the deepest caves and reached both poles. Yet it is polished, too, with its signature satin finish. As to the exceptional legibility of its dial, reinforced by the luminescent Chromalight display, it has been field-tested through the thickest blizzards and the longest nights, by all manner of explorers. That special breed of men and women who inspired our own quest as watchmakers. Rest assured, it is a path we intend to keep on exploring.
The Explorer II.

#Perpetual

ROLEX
OYSTER PERPETUAL DATE
EXPLORER II
28
SUPERLATIVE CHRONOMETER
OFFICIALLY CERTIFIED
24
2
4
6
8
10
12
14
16
18
20
22

OYSTER PERPETUAL
EXPLORER II

ROLEX

Maple Leaf
ADVENTURES

Iconic Boats & Secret Spots

CANADIAN Geographic
ADVENTURES

When Paula Carey and husband Nicholas Wemyss wanted to take a luxury cruise without the crowd, a European-style river cruise without the long flight and carbon footprint, and have an educational experience with like-minded passengers. Maple Leaf Adventures' expedition fit the bill.

"We had just got back home from a Maple Leaf Adventures trip to Haida Gwaii – I hadn't even unpacked – when I decided to take another one," says Carey, a 62-year-old yoga teacher from Victoria, B.C. "One month later, we were on the Wild Side of Vancouver Island trip."

Maple Leaf Adventures, a 38-year-old operator based in Victoria, offers a variety of West Coast expedition cruises, with five- to 11-day itineraries, aboard three boutique vessels: Maple Leaf, a sailing ship; Swell, a coastal heritage tugboat and Cascadia, a luxury catamaran.

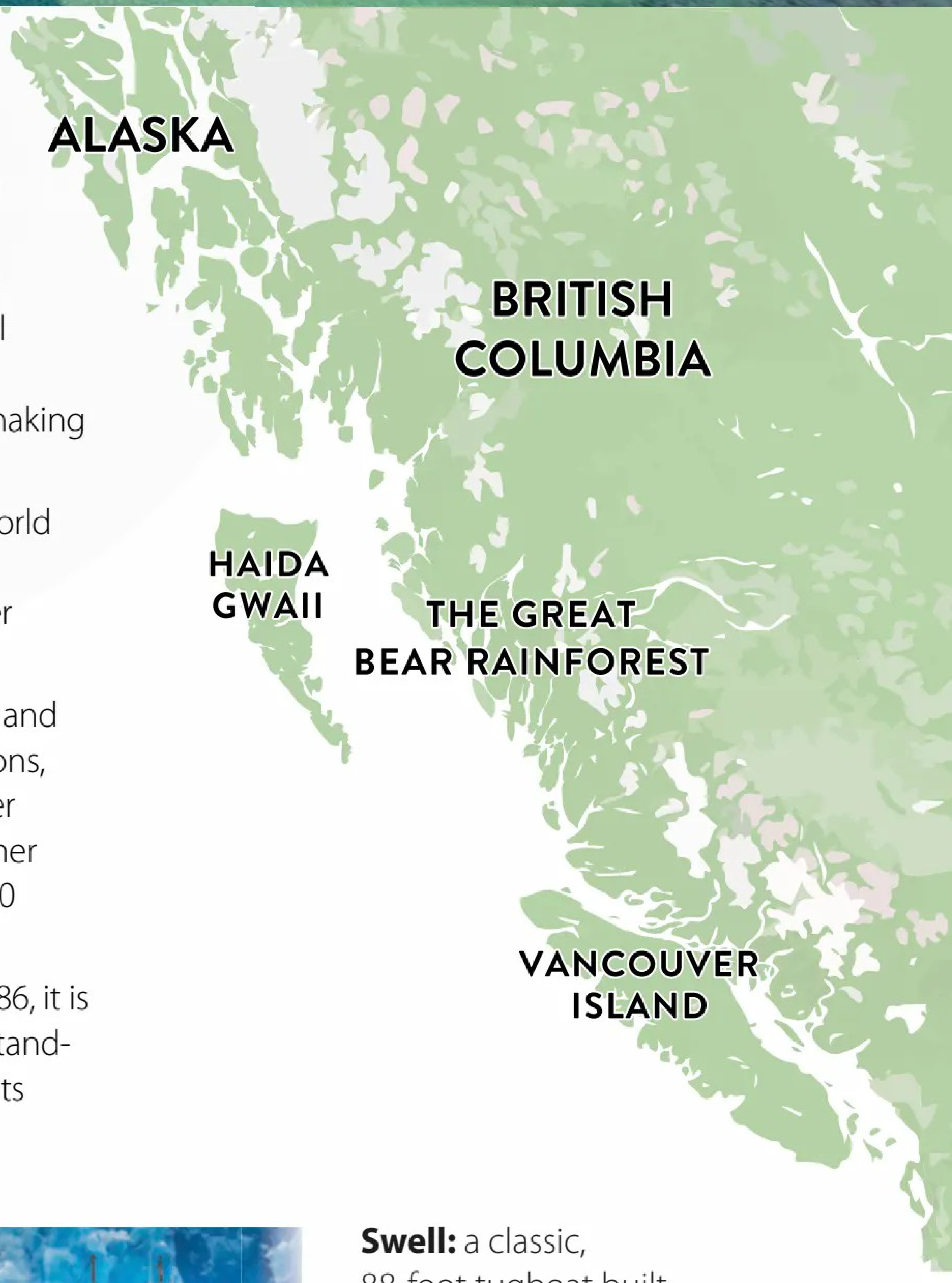
They are the perfect way to escape summer crowds, and enjoy wildlife, beaches, exploring, culture and great hospitality.

Designed to hug the shoreline and navigate the fiords that slice the coastal mountain ranges, these small vessels sail in destinations between Vancouver Island and Sitka, Alaska, making onshore stops along the way.

"There are few places left in the world with natural systems as intact as this coastline," says Maple Leaf's co-owner Maureen Gordon.

The company keeps its trips small and personalized, exploring specific regions, like the northwest coast of Vancouver Island or Haida Gwaii, for a week, rather than steaming past it all in a day at 20 knots.

An ecotourism company since 1986, it is considered a forerunner for its longstanding protocols with First Nations and its regenerative travel practices.



Meet the Coastal Expedition Ships

Maple Leaf: a classic, 92-foot schooner built in Vancouver in 1904, 8 guests;

Swell: a classic, 88-foot tugboat built in Vancouver in 1912, 12 guests;

Cascadia: a light-filled catamaran designed specifically for expedition tourism, 24 guests.

DESIGNATED
TRAVEL PARTNER

Contact us for 2025 & 2026 Itineraries

Call 250.386.7245 or visit MapleLeafAdventures.com

CONTENTS

MARCH/ APRIL 2025

ON THE COVER

Photographer Donna Feledichuk snapped this image of a Canada lynx last summer when she glimpsed the animal along a country road in Lac La Biche, Alta.

Canadian Geographic
BEST SHOTS
FROM OUR
ANNUAL PHOTO
COMPETITION
JASPER JOURNEY
TO MALIGNE LAKE
VANCOUVER'S
SANDPIPER
STOPOVER

32 THE DAM, THE MYTH, THE LEGEND

An exploration of the landscape-shifting icon celebrating 50 years as Canada's national symbol: the beaver

By Brian Banks

42 NATURE MEANT US ALL TO BE WILDFLOWERS

A journey of friendship, loss and healing in the footsteps of an early 20th-century mountain explorer

By Meghan J. Ward with photography by Natalie Gillis

58 THE MAGIC IN THE MUD

An invisible fuel draws thousands of migrating sandpipers to the Roberts Bank mudflats each year

Story and photography by Isabelle Groc

68 CANADIAN PHOTOS OF THE YEAR 2024

Canadian Geographic presents the winners of our annual photo competition

COVER: DONNA FELEDICHUK. FROM TOP: ISABELLE GROC; NATALIE GILLIS

12

DEPARTMENTS

17

28

14

82

12 BIG PICTURE
Celebrating Canada's grandeur

14 EXPOSURE
Showcasing our photo community

15 IN A SNAP
Sharing *Can Geo* via Instagram

30 ON THE MAP
Comparing Canada's highest mountains and their place as watershed cornerstones

77 YOUR SOCIETY
News from the Royal Canadian Geographical Society

80 COMING UP
Prairie storm chasers, *Can Geo*'s children's book, inside a wildlife research station and marine protection in northern Ontario

82 OUR COUNTRY
Roberta Bondar on the wonder of seeing Canada from the seat of a helicopter

26

DISCOVERY

17 INTERVIEW
Filmmaker and writer Julian Brave NoiseCat on his powerful documentary *Sugarcane*

20 WILDLIFE
Polar plant diversity, orca contamination, hazelnut oral history, eels on the edge and more

23 PLACE
Three endemic plants cling to life on Newfoundland's moon-like limestone barrens

26 HISTORY
Sixty years ago, the iconic Canadian flag was raised, but not before a fiery Great Flag Debate

28 INFOGRAPHIC
How beavers engineer a more climate-resilient landscape

CLOCKWISE FROM TOP: SHANE TURGEON; PETER POWER/TORONTO STAR PHOTOGRAPH ARCHIVE; ROBERT CARTER; GERALD SITU; EMILY KASSIE/SUGARCANE FILM LLC; DAVID WYSOTSKI

HERE YOU ARE

31.56782° N, 111.05104° W

Take a few days.
Go back a few centuries.

Visit a new state of mind.

VISITARIZONA.COM/CANADA

ARIZONA

DIGITAL CONTENTS

DISCOVER

CORE STRENGTH
Few places on Earth are as inhospitable as the summit of Mount Logan, Yukon, the highest mountain in Canada at 5,959 metres. But for glaciologist and climber Alison Criscitiello, and a six-person team, the trek through challenging terrain and tent-burying storms was the necessary means to an end: extracting a more than 250-metre-deep ice core estimated at 20,000 to 30,000 years old. Here, Criscitiello discusses her expedition and why ice cores like this are so important. **cangeo.ca/forwinter**

COVER STORY

CANADIAN Geographic
BEST SHOTS
FROM OUR
ANNUAL PHOTO
COMPETITION
JASPER JOURNEY
TO MALIGNE LAKE
VANCOUVER'S SANDPIPER STOPOVER

56%

CANADIAN Geographic
PHOTO CONTEST
WINNERS
JASPER JOURNEY
TO MALIGNE LAKE
VANCOUVER'S SANDPIPER STOPOVER

44%

Two show-stopping entries to our annual photo contest made it to the cover vote on the @CanGeo Instagram account. Readers — and *Can Geo*'s editors — loved the emotional gaze of the red fox photographed by Christina Doherty in downtown Toronto. But ultimately, the lynx reigned supreme, shot by Donna Feledichuk in Lac La Biche, Alta. With its crystal clear focus, springtime colours and equally-striking eye contact, this image nabbed the March/April issue's cover with 56 per cent of the vote.

PHOTOGRAPHY CLIMATE NEWS TRAVEL WILDLIFE CULTURE
Canadian Geographic Newsletters
CANGEO.CA/NEWSLETTERS

Can Geo Travel

Amalfi adventure
Horizons are abundant on the mountainous Amalfi Coast in southern Italy, where sea meets sky along narrow roads cut into limestone cliffs. But there's more to a horizon than a gorgeous view. *Can Geo Travel* columnist Robin Esrock and his 11-year-old daughter expand their cultural, social, historical and culinary horizons during a week of action-packed family adventure. **cangeo.ca/amalfi**

Can Geo HERE & THERE

HOLLYWOOD NORTH
The film industry has been a part of Vancouver's identity for as long as Here & There senior producer Lia Grainger can remember. But she never understood why her city became the go-to spot in North America, after Los Angeles, to make films and TV, until now. Listen as Grainger traces Vancouver's now multi-billion dollar film industry back to one thrilling movie shot in the early '90s. **cangeo.ca/hollywoodnorth**

Canadian Geographic

CONNECT WITH US ONLINE

- cangeo.bsky.social
- facebook.com/cangeo
- @CanGeo
- youtube.com/canadiangeographic

CLOCKWISE FROM OPPOSITE TOP: NATIONAL GEOGRAPHIC/LEO HOORN; ROBIN ESROCK; MUDDYMARI/ISTOCK. COVERS, LEFT TO RIGHT: DONNA FELEDICHUK; CHRISTINA DOHERTY

EDITOR'S NOTEBOOK

WILL LAMBERT/CAN GEO PHOTO CLUB

NOT YOUR 51ST STATE

AS WE WERE GETTING this issue ready to go to press, U.S. President-elect Donald Trump made a series of comments, on social media and in interviews, suggesting that Canada should become the 51st state.

Reaction from our side of the border was swift, ferocious and almost unanimously opposed (one online poll found that just 13 per cent of Canadians thought it was a good idea). It was kind of heartening, actually. We may never reach an internal consensus on what it means to be Canadian, but on this we're agreed: we're *not* American.

Coincidentally, this issue has a strong current of Canadiana running through it. Two of our national symbols celebrate big anniversaries this year: the industrious beaver, commemorated with an infographic on page 28 and a colourful feature on page 32, and the iconic maple leaf flag, which was hoisted for the first time 60 years ago after months of hot debate and political games (see page 26 for the full story). And the winners of our long-running annual photo competition (page 68) are themselves a visually stunning tribute to the wildlife and landscapes of this beautiful land we call Canada.

On page 42, we also celebrate trailblazing explorer Mary Schäffer Warren, who found healing and a home in the Canadian Rockies and whose story reminds us that nature is for everyone — a powerful message for these times.

Whether Trump's remarks were a joke, a bullying tactic or a sincere threat, it's clear that now, more than ever, Canadians need to come together to protect what we love and what makes us distinct. Perhaps something to rally around can be found in these pages.

—Alexandra Pope

To comment, please email editor@canadiangeographic.ca or visit cangeo.ca.

For inside details on the magazine, follow editor Alexandra Pope on Bluesky (@xelaepop.bsky.social) and Instagram (@xela.explores).

Help us tell

CANADA'S STORY

Since 1930, ***Canadian Geographic*** has been a trusted source for journalism in Canada. As one of the few print and online magazines left,

we need your support.

AMANDA BEERS/CAN GEO PHOTO CLUB *Off cover price

CANADIAN Geographic
ICE GRIZZLIES
FINDING BALANCE ON YUKON'S KLUKSHU RIVER
EPIC AURORA
TRUSTING THE TAPS

CANADIAN Geographic

Help support fact-checked, quality journalism about Canada.

SUBSCRIBE AND SAVE.

6 ISSUES
OF *CANADIAN GEOGRAPHIC*

Support by subscribing and **SAVE**
62%*

ORDERING IS EASY!
VISIT: CANGEO.CA/SUBSCRIBE

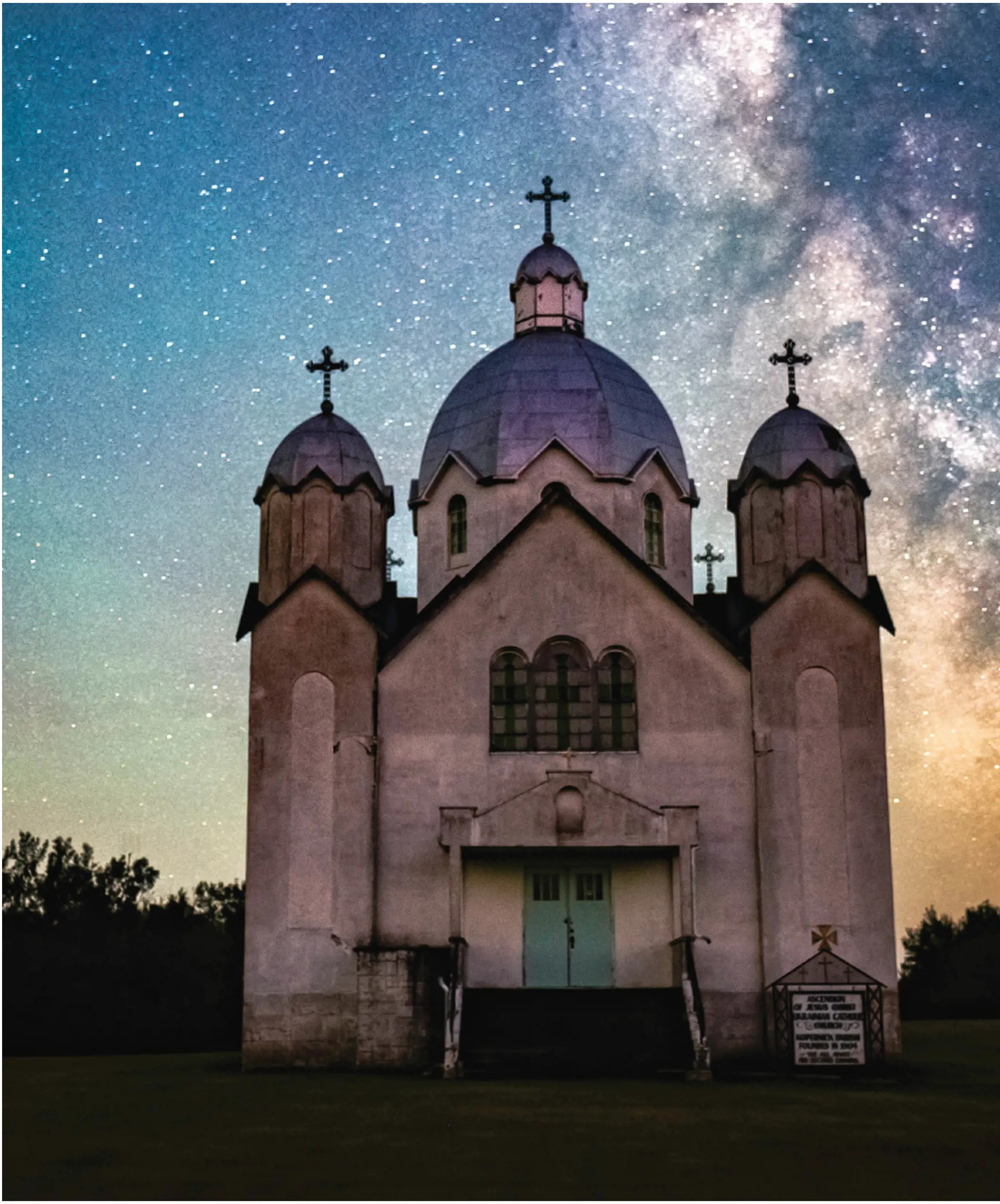
ONLY
$28.50
A YEAR!

ROYAL CANADIAN GEOGRAPHICAL SOCIETY

CANADIAN Geographic

BIG PICTURE

Celebrating Canada’s Grandeur



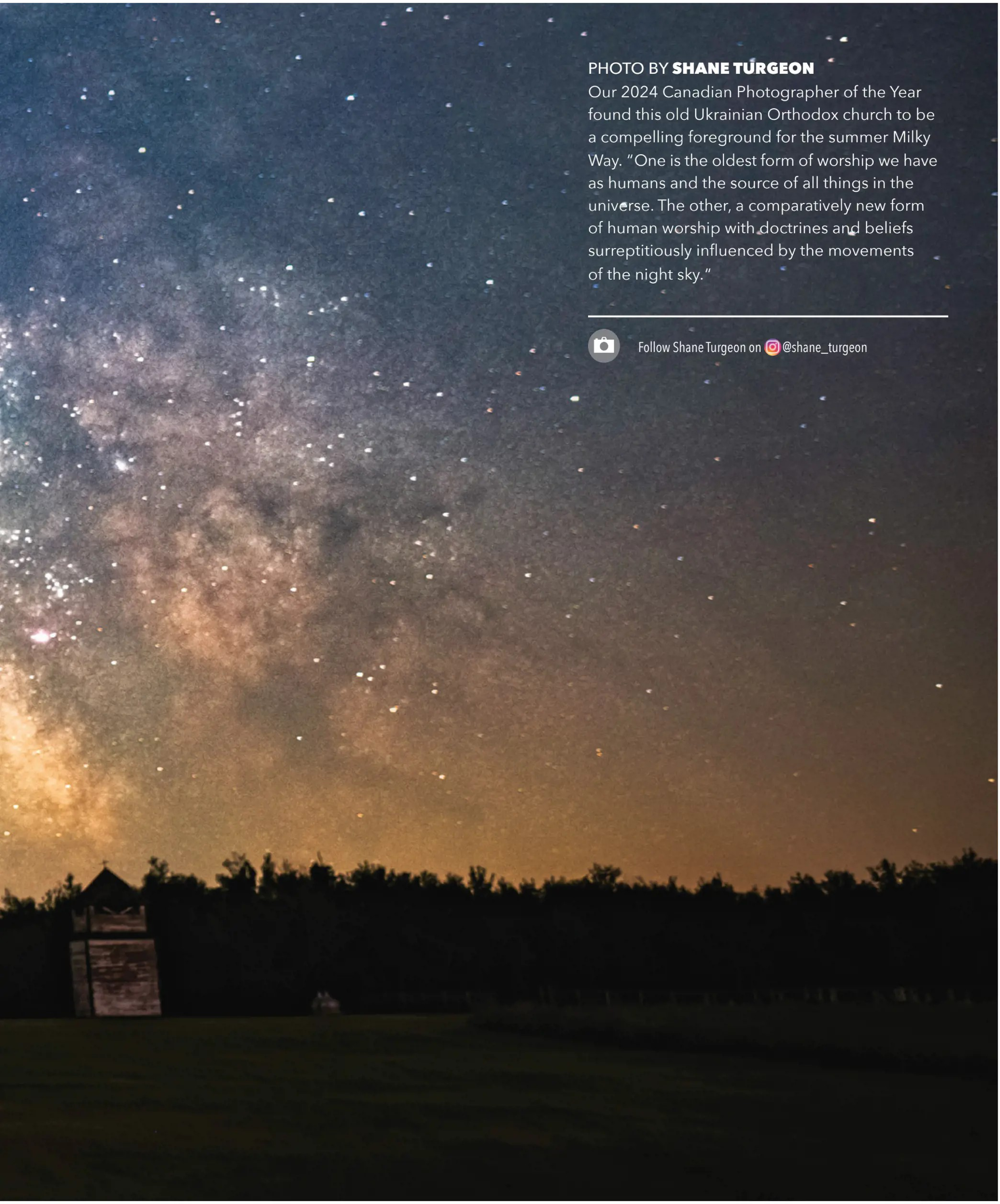


PHOTO BY **SHANE TURGEON**
Our 2024 Canadian Photographer of the Year found this old Ukrainian Orthodox church to be a compelling foreground for the summer Milky Way. "One is the oldest form of worship we have as humans and the source of all things in the universe. The other, a comparatively new form of human worship with doctrines and beliefs surreptitiously influenced by the movements of the night sky."

Follow Shane Turgeon on @shane_turgeon

Canadian PHOTOS OF THE YEAR 2024

HONOURABLE MENTION

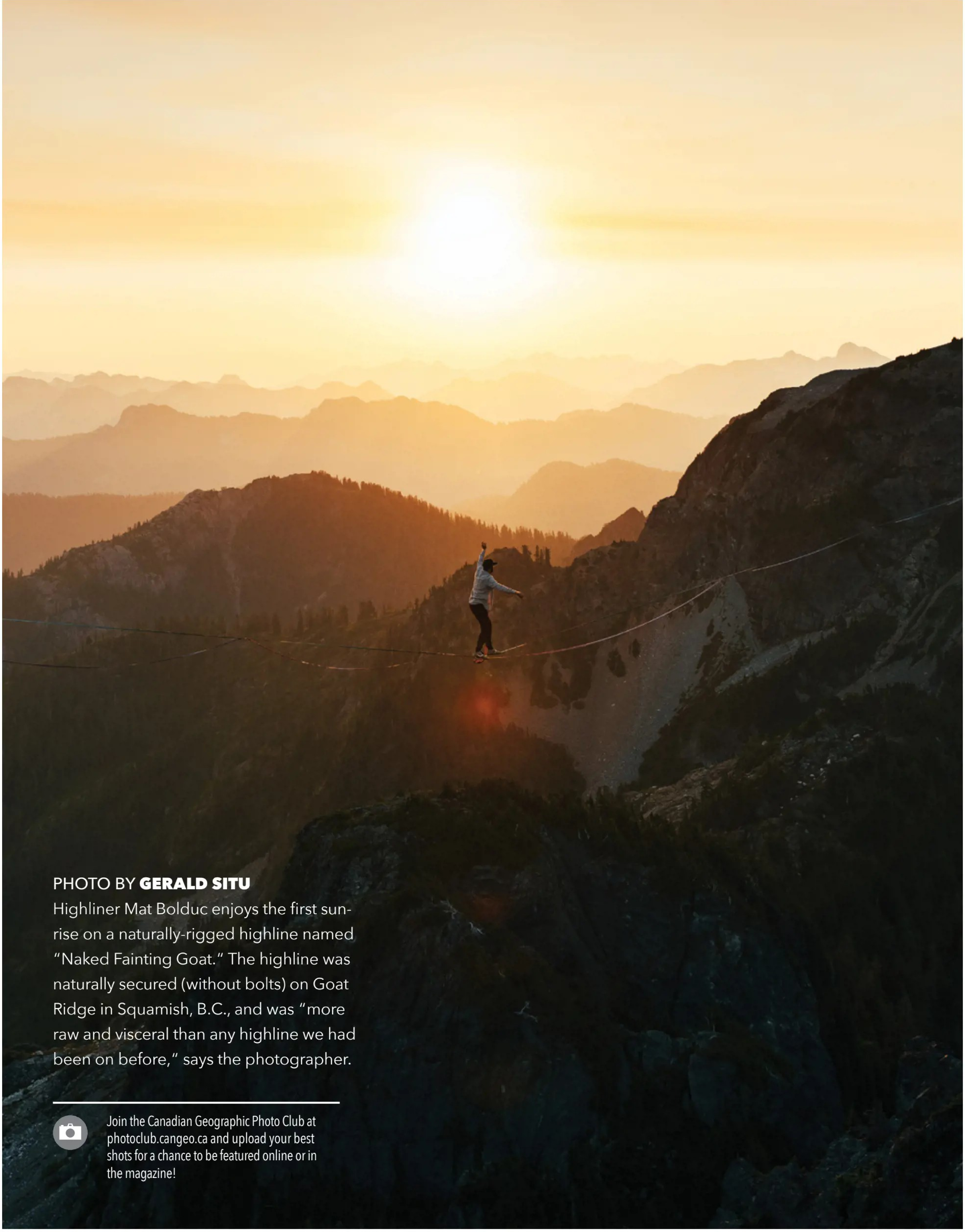


PHOTO BY **GERALD SITU**
Highliner Mat Bolduc enjoys the first sunrise on a naturally-rigged highline named "Naked Fainting Goat." The highline was naturally secured (without bolts) on Goat Ridge in Squamish, B.C., and was "more raw and visceral than any highline we had been on before," says the photographer.

Join the Canadian Geographic Photo Club at photoclub.cangeo.ca and upload your best shots for a chance to be featured online or in the magazine!

IN A SNAP

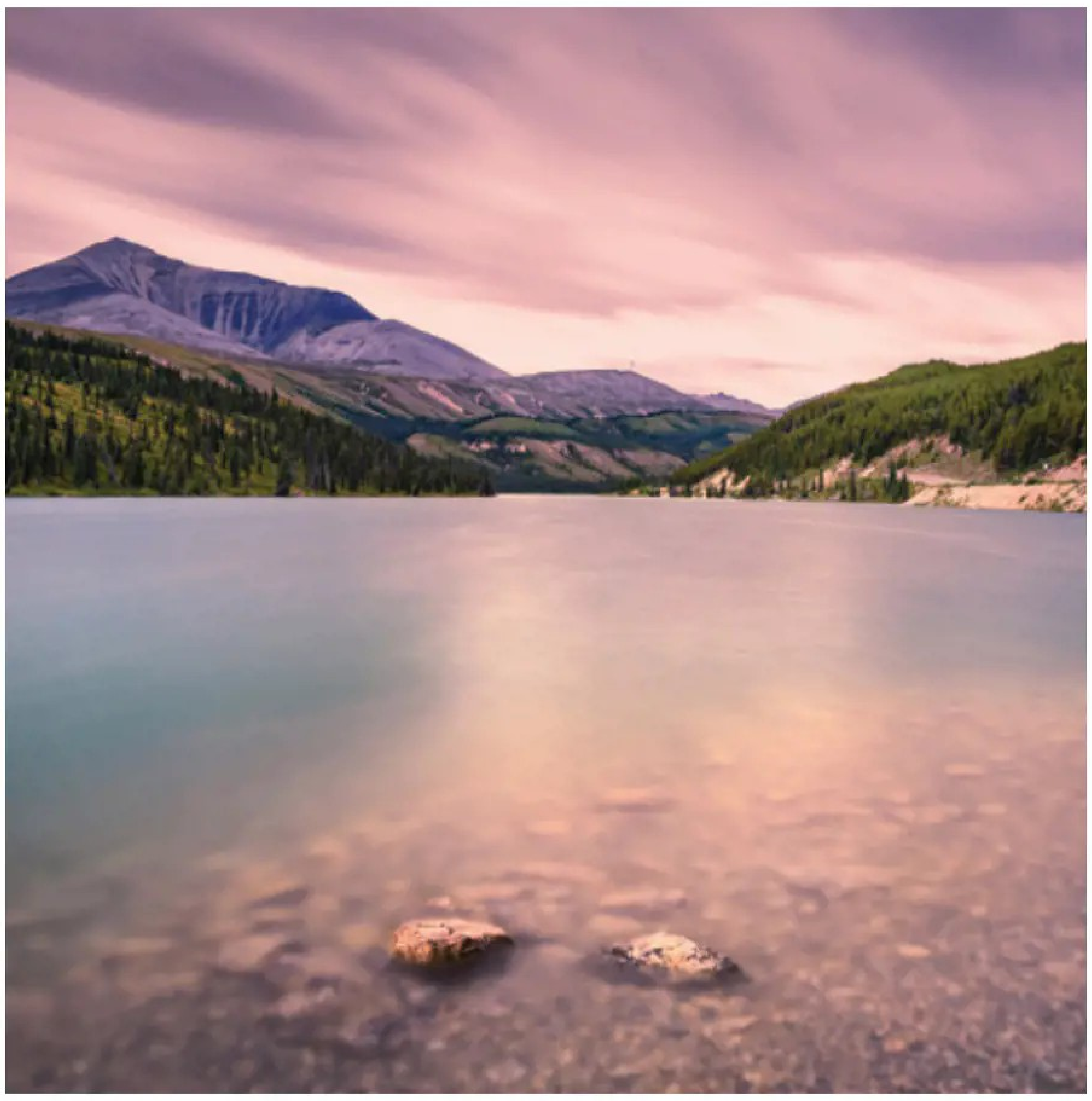
Sharing Can Geo via Instagram

@cgwildlifephotography **Charlotte Gruneau**
Thick-horned nudibranch (*Hermissenda crassicornis*) near Sidney, Vancouver Island, B.C.

@tim_j_hopwood_photography
Tim Hopwood Stilt sandpiper, Chaplin, Sask.

@westcoast_landscapes **Alana Zaal**
Mushroom on the S'tsailes Heritage Trail, B.C.

@marie.r.eve **Marie-Ève Parent**
Young common loon, Laurentides, Que.



@pandey.vaibhav **Vaibhav Pandey**
Sunset at Summit Lake, Stone Mountain Provincial Park, B.C.

Find us @CanGeo and share your best photos with us using the hashtag #ShareCanGeo.

Discover an Interactive Experience That Engages and Amazes!

Step into an interactive journey across Canada's electricity and renewable energy system with the Great Canadian Electricity Map. Discover the technology behind wind turbines, nuclear power plants, solar energy, and hydro systems. Use your mobile device to scan QR codes to explore the people and infrastructure powering the country.

For Educators

Discover how electricity is generated and how electrifying Canada can help achieve climate goals. Our teaching resources include a learning guide and student activity cards, created with **Canadian Geographic Education**. Since launching in the fall of 2023, over 8,000 students have already enjoyed this experience.

"We had an amazing experience!"
– Heather Yates, teacher

"We absolutely loved it."
– *Michelle* Brosseau, teacher

For Industry Event Organizers

Create a memorable experience for your attendees as they step into this interactive activity. Reveal the hidden power of electricity and renewable energy across the country. It's great for trade shows, conferences, and company events.

Book Your Map Visit

To book the map for your classroom or event, scan the QR code or visit: **ehrc.ca/map.**

EHRC

This program is supported by:

CUSW

hydro one

aeso

Canadian Geographic

ÉDUCATION Canadian Geographic EDUCATION

Natural Resources Canada
Ressources naturelles Canada

Julian Brave NoiseCat competes at the Kamloopa Powwow in the film.

Julian Brave NoiseCat

The filmmaker and writer on his Oscar-shortlisted documentary on St. Joseph's Mission Residential School

INTERVIEW BY **DAVID MCGUFFIN**

EMILY KASSIE/SUGARCANE FILM LLC

Listen to the full interview on the Explore podcast, wherever you get your podcasts.

When Julian Brave NoiseCat and Emily Kassie set out to make *Sugarcane*, they had little idea of how personal it would become. Their film often appeared guided by fate: how Williams Lake First Nation came to be involved in the story; how the story took them to St. Joseph's Mission Residential School, where NoiseCat's father had survived against the odds. *Sugarcane* weaves the healing of a father and son into the story of Williams Lake's investigation into abuse and missing children at St. Joseph's Mission. A favourite for Best Documentary Feature at this year's Oscars, the film is now guiding truth and healing efforts in both Canada and the United States.

On *Sugarcane's* fateful beginnings

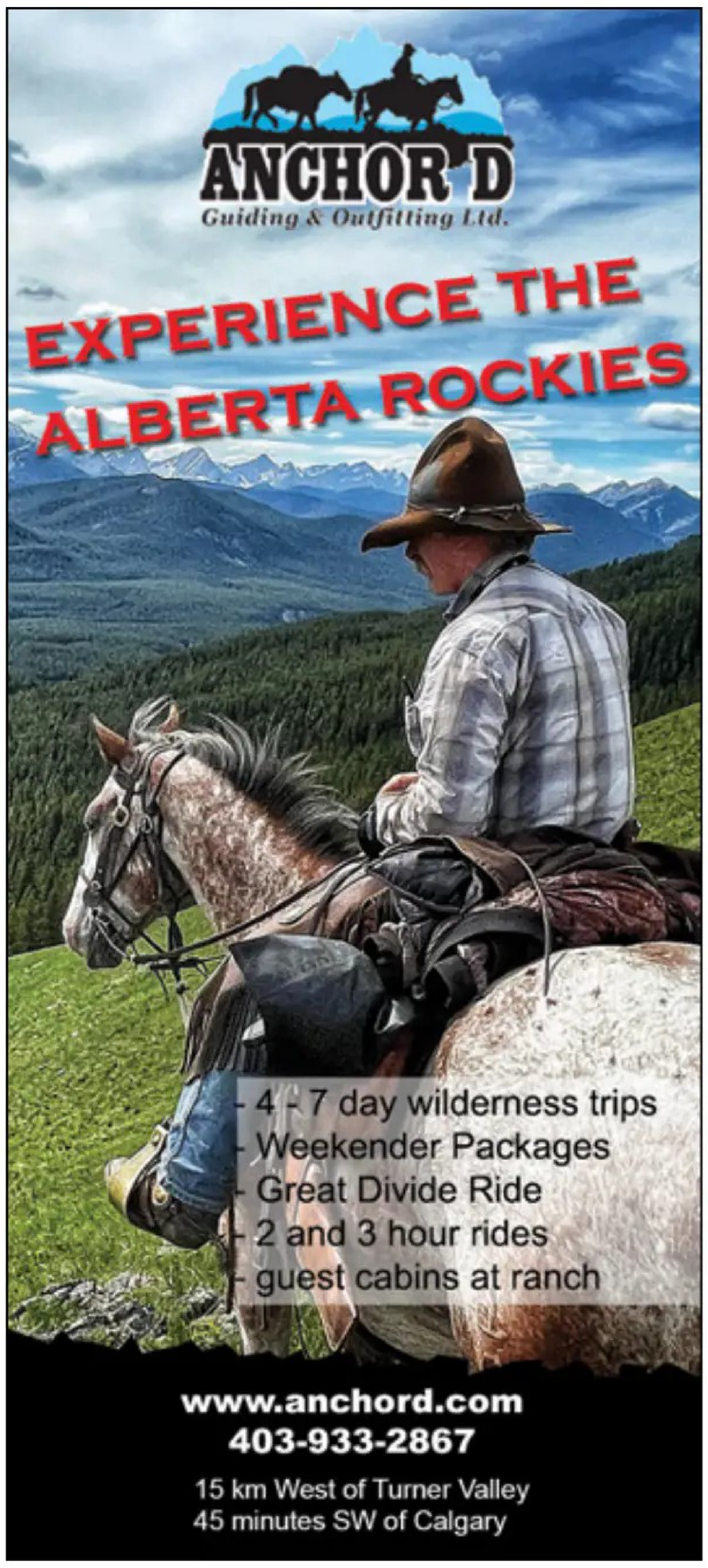
When my co-director, Emily Kassie, asked me to collaborate, I told her I would take a couple of weeks to think about it. My family had a very traumatic connection to the Indian Residential Schools. I didn't know the specifics, but I knew there was a story there, and I didn't know if I was ready to touch that. In that time, she emailed the chief of [Williams Lake] First Nation, Willy Sellars, [who] called back and said, "The Creator has always had good timing." When she told me she'd found a First Nation

Ed Archie NoiseCat (ABOVE), Julian's father, grapples with the truth of his secretive birth at St. Joseph's Mission (LEFT).

that [wanted to document their] search at St. Joseph's Mission near Williams Lake, B.C., I was floored. Because, out of the 139 Indian Residential Schools in Canada, that was the school my family was sent to and where my father was born. It was like this story found them and then found us. And that made it something, ultimately, I couldn't turn away from.

On the film's personal nature

For the first year of filming, we didn't record anything about my story or my family's story. The agreement at the beginning was that Emily and I would be co-directors, not that I was going to be a participant. But as the story unfolded, it increasingly felt that the only right way to do this, given the other participants in this documentary were gifting us with their own traumatic stories, their own bravery in confronting this history of cultural genocide… The *only* right way — especially when you happen to be the son of the only known survivor of the incinerator at St. Joseph's Mission — was to go there with my family's story to reciprocate the bravery of people who did not have directing roles in this film. I will always be grateful for how I chose to live this moment of reckoning for my people and my family.



ANCHOR D
Guiding & Outfitting Ltd.
EXPERIENCE THE ALBERTA ROCKIES
- 4 - 7 day wilderness trips
- Weekender Packages
- Great Divide Ride
- 2 and 3 hour rides
- guest cabins at ranch

www.anchord.com
403-933-2867
15 km West of Turner Valley
45 minutes SW of Calgary

On cross-border reckonings

When the news came out about the potential unmarked graves at the Kamloops Residential School, it felt like it was an opportunity for the U.S., or at least the U.S. media, to go "My God, look at what Canada did." Which is profoundly ironic because there were nearly three times as many Native American boarding schools in the United States as there were Indian Residential Schools in Canada. In many ways, the American system was the basis for the Canadian one. But there is no parallel reckoning yet happening in the U.S. The U.S. government arguably has more culpability because — unlike in Canada, where the schools were [mostly] run by the church — the schools were often run by the government. But there is now a proposal for a truth and healing commission that's moving through the Senate. Our film screened in the Senate in December. This is a history that is just now starting to be a part of a national conversation in the U.S. We're very lucky that our film has come out at a time when we can be part of that effort.

On the ability to heal

My dad had the opportunity to ask his mom some questions that have always been nagging at his soul. I had the opportunity to not just have some conversations with my father but also to *live* with my father for a couple of years. We took an unforgettable road trip back home to the rez and to the mission where he was born.

There have been so many instances of us screening the film where somebody comes up to us afterwards and says, "I saw so much of myself in this film. I saw so much of my father in your father. I saw so much of my grandparents in yours." For those people to finally have the courage to ask those members of their family about what they endured… we've just now started to see that happening, and it has been the honour of my lifetime to play a small role in that movement. When we look at what these institutions did, it's hard to see anywhere in Indian Country that was not deeply, deeply scarred by this history, where this history did not ripple across generations of families and communities. The first way to start getting around that is to start putting words to it, to start speaking the truth. ❁

EMILY KASSIE/SUGARCANE FILM LLC

Canadian Geographic
ADVENTURES

DESIGNATED
TRAVEL PARTNER

KLAHOOSE
WILDERNESS RESORT

Welcome to Klahoose Wilderness Resort, an award-winning Indigenous eco-resort nestled in the pristine beauty of British Columbia's Desolation Sound. Proudly 100% Klahoose Nation-owned, we offer a fully off-grid retreat for those seeking authentic Indigenous experiences and extraordinary wildlife encounters.

Our expertly curated 3- to 4-night all-inclusive packages include spring bear viewing, captivating whale watching, grizzly bear tours during the fall salmon run, and immersive Indigenous cultural experiences.

Begin your journey with a scenic drive to Lund or a short flight from Vancouver to Powell River, and let us guide you into the heart of nature and tradition, where each moment connects you to this remarkable land.

CONTACT US FOR STAYS IN THE 2025 SEASON

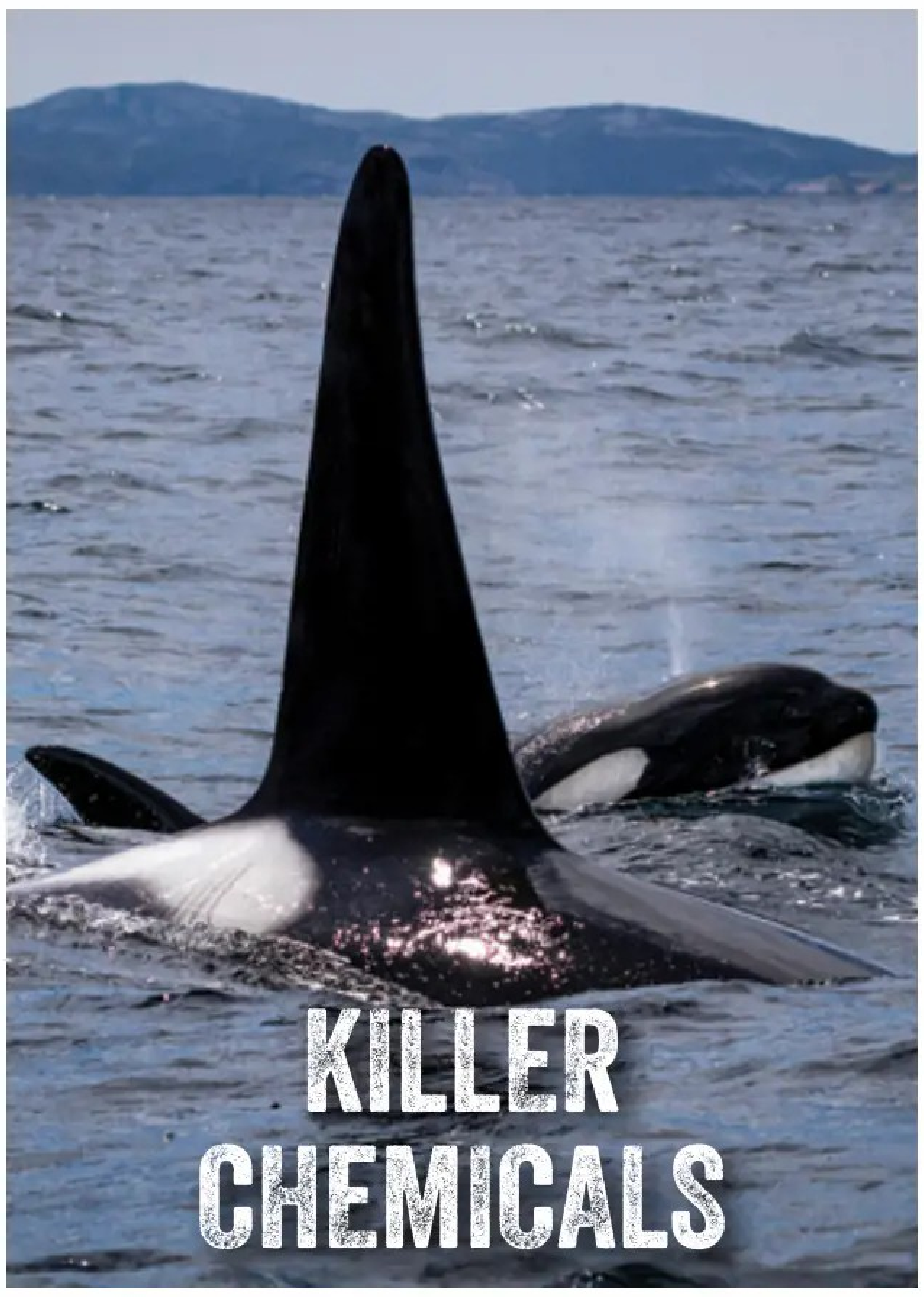
Call toll free 1-833-443-3838 or visit KlahooseResort.com

Light the way

THE EXTREME LIGHT ENVIRONMENT of the Earth's polar regions may help sustain plant biodiversity. Researchers from the University of Turku, Finland, have theorized that the long summer days and winter nights in these regions create "hybrid zones" that force all species into smaller reproduction windows. Unlike temperature, day length is unaffected by climate change and other environmental factors. This means species such as flowering plants in these regions have adapted to use day length to time their reproduction. Chances of closely related plants flowering simultaneously are therefore improved, ultimately creating opportunities for species to hybridize and boost biodiversity.

Eider here nor there

COMMON EIDERS WERE FLOURISHING at the turn of the century. Then they disappeared, particularly in the Gulf of Maine, where an estimated 85 per cent of breeding eiders have been lost. Now, one study running since 2019 may explain why. Eiders are declining, but mostly in the middle of their range (Gulf of Maine) while northern (Quebec, Newfoundland and Labrador) and southern (Massachusetts, New York, Rhode Island) populations are growing. Rapid seawater warming in the Gulf of Maine is likely disrupting eider food sources, while melting ice to the north has created new feeding opportunities.



KILLER CHEMICALS

POLYCHLORINATED BIPHENYLS and organochlorine pesticides have been banned since the '80s and '90s. But according to a recent McGill University study, these legacy pollutants continue to contaminate Atlantic killer whales, as their stable chemical structures allow them to persist in the environment for decades. Researchers found that high levels of these chemicals put the whales at elevated risk of severe immune and reproductive issues. While contamination appears to be decreasing in other whale species, orcas continue to be affected because they prefer prey higher in the food chain (where chemicals bioaccumulate) in coastal areas where the chemicals may persist.

Read *Canadian Geographic*'s latest wildlife stories at cangeo.ca/wildlife.

7,000 years

THAT'S HOW LONG beaked hazelnuts have been transplanted and cultivated by Gitxsan, Tsimshian and Nisga'a peoples on B.C.'s northwestern coast. A new study, led by Simon Fraser University researcher Chelsey Armstrong, found genetic and linguistic evidence of widespread human-led distribution of hazelnut species in the region stretching back 7,000 years. The study also suggests hazelnuts spread via trade routes from an ancient city on the Skeena River called Temlaxam. "That means that we have modern science supporting oral histories, because the city is in the oral histories of all the Sm'algyax-speaking people," says the Indigenous Food Sovereignty Association's Jacob Beaton, who is Tsimshian.

"ONE MINUTE TO MIDNIGHT"

AMERICAN EELS use the St. Lawrence and Ottawa rivers to migrate between their Great Lakes home and spawning waters in the Sargasso Sea near Bermuda. But hydroelectric dams on these rivers can be devastating, killing up to half of the eels trying to pass their turbines. Now, Kitigan Zibi Anishinābeg First Nation, just north of Ottawa, is calling on the provincial and federal governments to install safer turbines at the Carillon generating station on the Ottawa River to help the eels pass safely. The river has seen a 99 per cent drop in eel populations, with one biodiversity consultant for the nation describing the eels' plight as "one minute to midnight."

OPPOSITE PAGE: SOPHIA GRANCHINHO. THIS PAGE, CLOCKWISE FROM TOP: © EMILE DAVID; CHELSEY ARMSTRONG; OTTAWA RIVERKEEPER; MICHAEL WINSOR

ÉTIENNE TREMBLAY/CAN GEO PHOTO CLUB

CANADIAN
Wildlife
PHOTOGRAPHY
OF THE YEAR 2025

COMPETITION
OPENS MARCH 1

ENTER **NOW** AT
cwpy25.canadiangeographic.ca

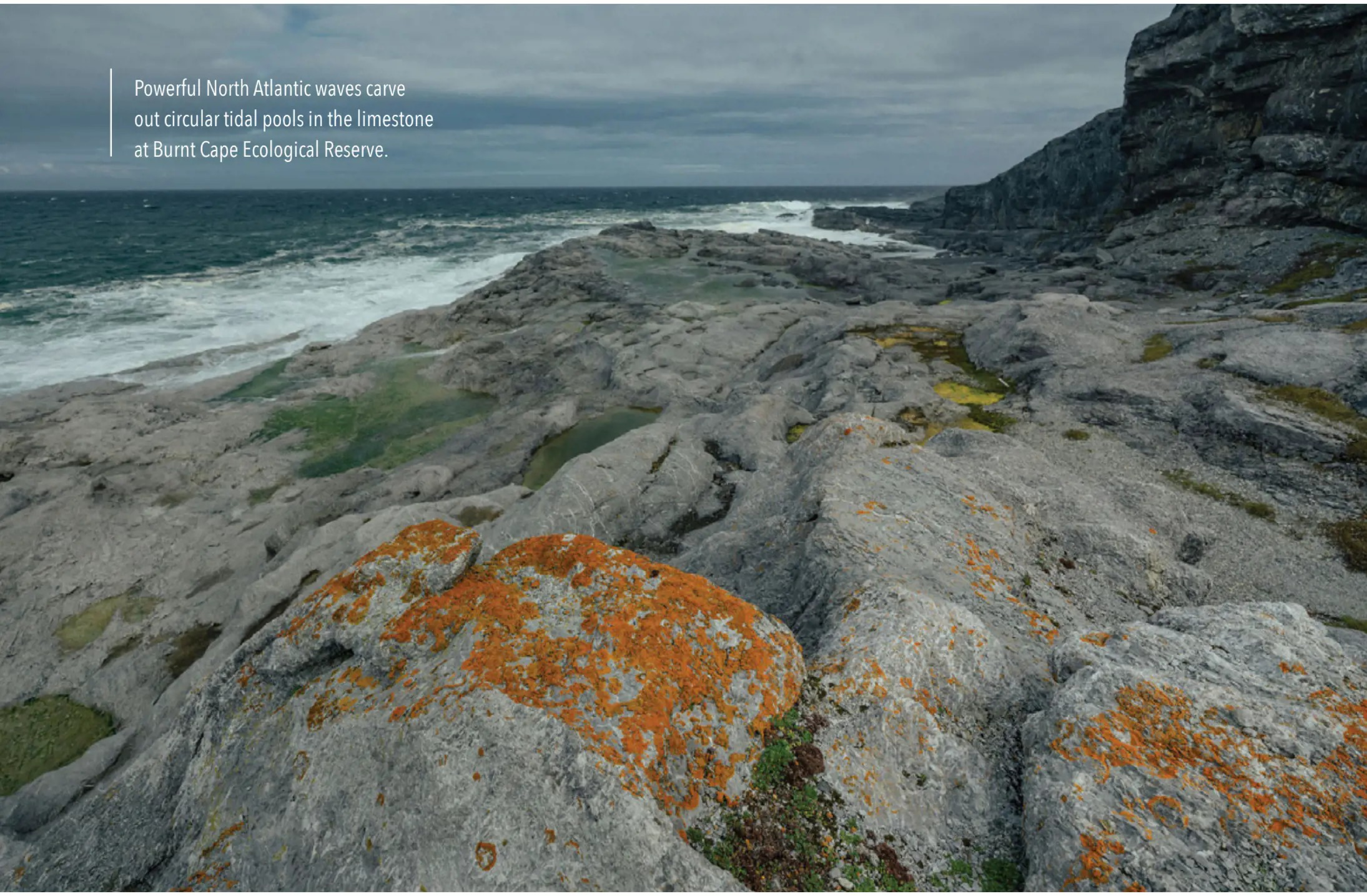
Submit your best wildlife photos for a chance to win fabulous prizes, including the **chance** to be published in a future issue of ***Canadian Geographic***!

CANADIAN Geographic
PHOTO CLUB
photoclub.cangeo.ca

Anything but barren

Three plants unique to the limestone barrens of western Newfoundland thrive on the moon-like landscape of an ancient tropical sea

STORY AND PHOTOS BY **JOHNNY C.Y. LAM**



Powerful North Atlantic waves carve out circular tidal pools in the limestone at Burnt Cape Ecological Reserve.

IT'S A WONDER ANY LIFE can thrive here on the grey swath of windswept stones near Sandy Cove, northwestern Newfoundland. And yet, shooting up between cracks and crevices are three endemic plants found nowhere else on Earth: Long's braya, barrens willow and Fernald's braya. Their hardiness, says plant ecologist Luise Hermanutz, is that of "a true Newfoundlander."

"The adaptability of this little plant to such a harsh environment and infertile soil is nothing short of astonishing," says Hermanutz of Long's braya.

These ground-hugging plants root amid the rockery — barrens willow sprawls over the surface in a twiggy mat, while the white-purple flowers of the braya sit atop purplish stems rising a few centimetres from their bushy leaves. The trio are not just specialists in surviving the subarctic climate; they are "calcicoles," meaning they thrive in the lime-rich soils of the barrens.

To understand how these plants came to grow here requires looking back millions of years to when a tropical sea south of the equator teemed with life. The shells of those ancient marine creatures accumulated on the sea floor, hardening into limestone. Thrust upwards by a northward-shifting tectonic plate, the limestone reared its head thousands of kilometres away in the northwest Atlantic. Then, between two million and 15,000 years ago, glaciers and marine erosion carved these lands into the limestone barrens. Up close, the rock looks like weathered elephant skin.

Although this underlying geology makes up much of the west coast of Newfoundland — stretching from the Port au Port Peninsula in the south to the tip of the Great Northern Peninsula and parts of southern Labrador — only about 40 square kilometres of the barrens are openly visible. Here, strong onshore winds limit soil accumulation, slowing the growth of vegetation that covers the inland limestone.

But life persists: more than 100 rare plant species grow in this highly sensitive habitat, which is now protected by four ecological reserves: Table Point, Sandy Cove, Watts Point and Burnt Cape. Many grow nowhere else on the island, except for the few patches of exposed barrens along the northwestern coast. Long's braya, barrens willow and Fernald's braya, in particular, grow within just six kilometres of the coastline.

CANADIAN RIVER CRUISING VACATIONS
RIVER CRUISE VACATIONS
NOW BOOKING
Experience the beauty and history of Canada's rivers. 4, 5, 6, 7 nights of small ship cruising on a classic riverboat with departures from Kingston, Ottawa, and Quebec City.
Call to request our free travel brochure.
1-800-267-7868
www.StLawrenceCruiseLines.com
253 Ontario St., Suite 200 Kingston, ON K7L 2Z4
TICO #2168740

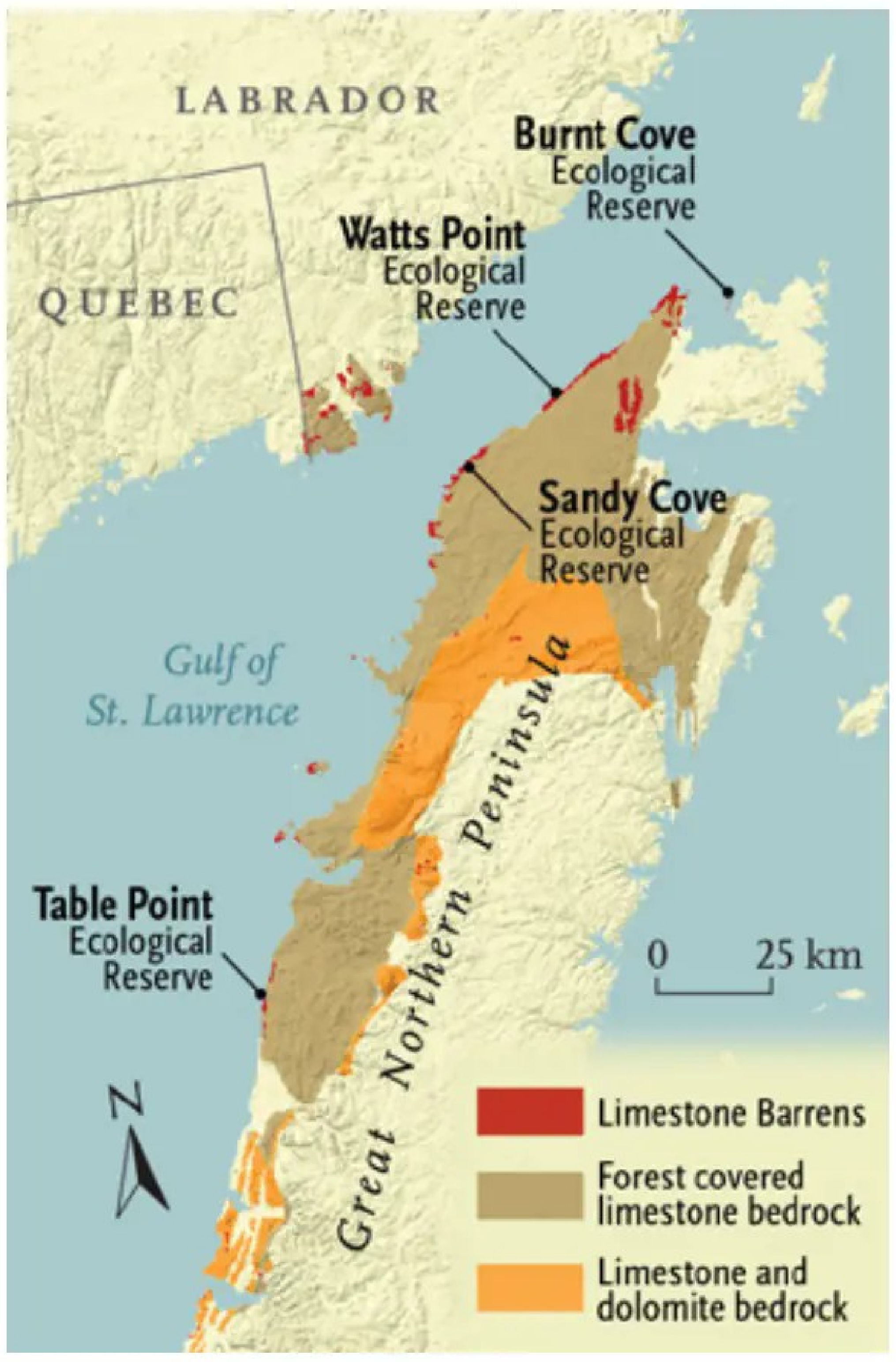
"The landscape might look stable and stationary, but it is actually highly dynamic," says conservation manager Donnell Gasbarrini of the Wilder Institute, which works to protect and restore this fragile habitat. "Because of the lack of soil accumulation, plants here are highly vulnerable. Rocks actually move and shift around by the forces of nature, which are invisible but always at work."

Other forces are at work too: human disturbance poses the greatest threat to the endemic plants. Since 2023, Gasbarrini has worked with community-based conservation organizations, local communities and students to clean up and restore a part of the barrens near Sandy Cove that was used as an unofficial dump after a limestone quarry there closed in 1975. The rock crusher and garbage were removed in 2011, but the damage had been done.

As well as human garbage, the piles of soil and rock from the quarrying era decomposed, creating nutrient-rich soil. While ideal for gardening, rich soil is detrimental to limestone barrens specialists and attracts invasive plants. When the community learned that Long's braya still had a toehold near the old dumping site, they were galvanized to act.

"The plants cannot be protected on their own. The only way to preserve them for the future is to protect their habitat," says botanist Michael Burzynski. A key member of the Limestone Barrens Species at Risk Recovery Team for almost 25 years, Burzynski has been taking cuttings and collecting seeds from the rare native plants of the barrens and propagating them for replanting.

Near Sandy Cove, a patch of crowberry is creeping across the earth next to a piece of rock encircled with a labelled orange ribbon. Other pops of colour scattered across the gravelly landscape indicate different species Hermanutz and team replanted in summer 2024 after a portion of the Sandy Cove barren had been cleaned up. The remaining gravel was reshaped to mimic the original marine terraces that had been cut by the ocean. Any rescued plants were used to re-establish more native vegetation on the restored barren.


LABRADOR
QUEBEC
Burnt Cove Ecological Reserve
Watts Point Ecological Reserve
Sandy Cove Ecological Reserve
Gulf of St. Lawrence
Table Point Ecological Reserve
Great Northern Peninsula
0 25 km
N
🟥 Limestone Barrens
Forest covered limestone bedrock
Limestone and dolomite bedrock

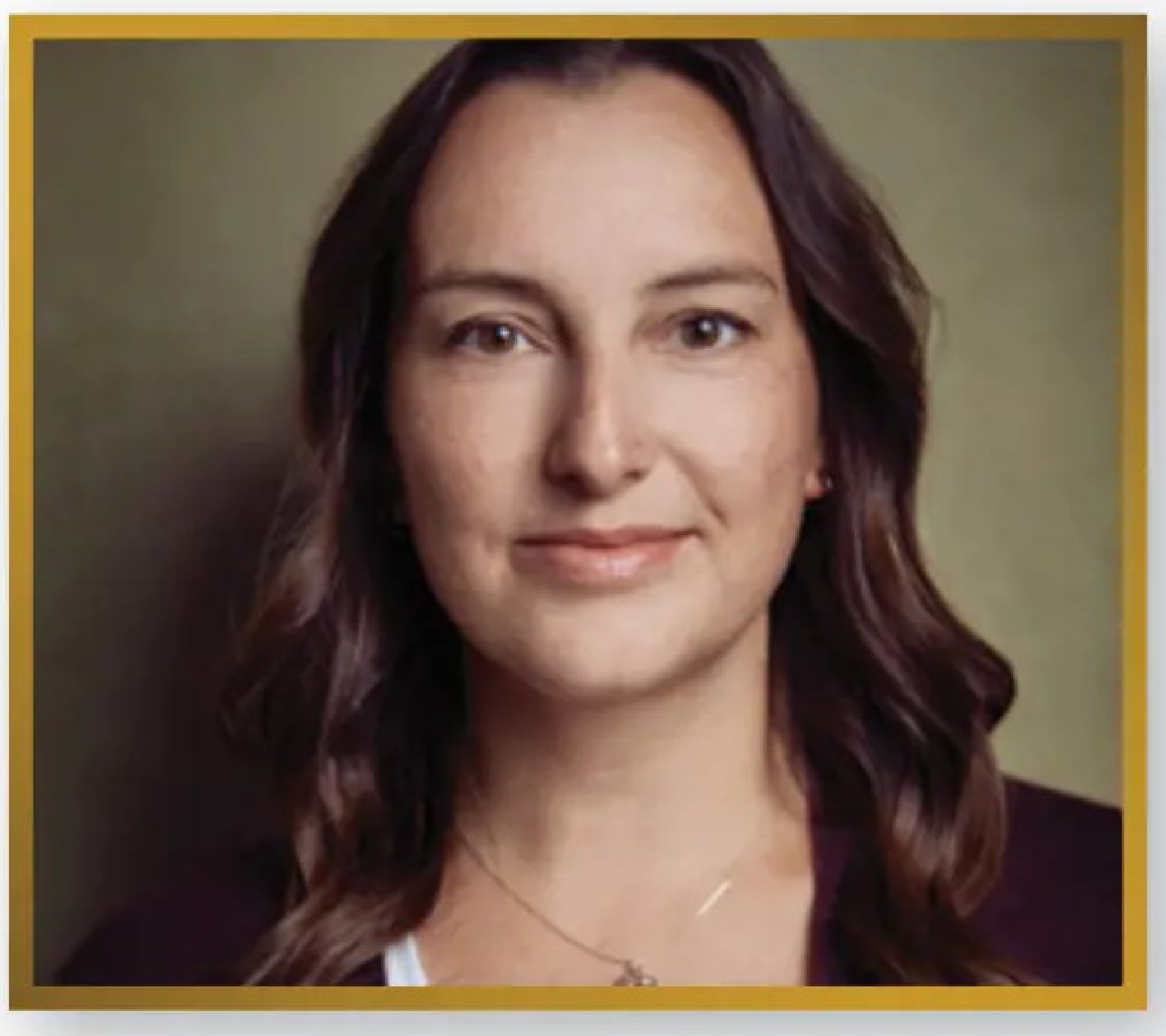
Replanted roseroot clings to the thin soil at the Sandy Cove barren.

MAP: CHRIS BRACKLEY/CAN GEO. DATA: COURTESY MICHAEL BURZYNSKI

The moon-like landscape at Burnt Cape, at the tip of the Great Northern Peninsula, is perhaps the most surreal of all the limestone barrens. It feels like the end of the Earth. Large boulders are scattered erratically along winding trails. I crouch down next to one of them and notice some roseroot and avens that managed to find shelter from the wind to put down roots. This is what clinging on for dear life looks like. ❋

CAN Geo TALKS

PRESENTS



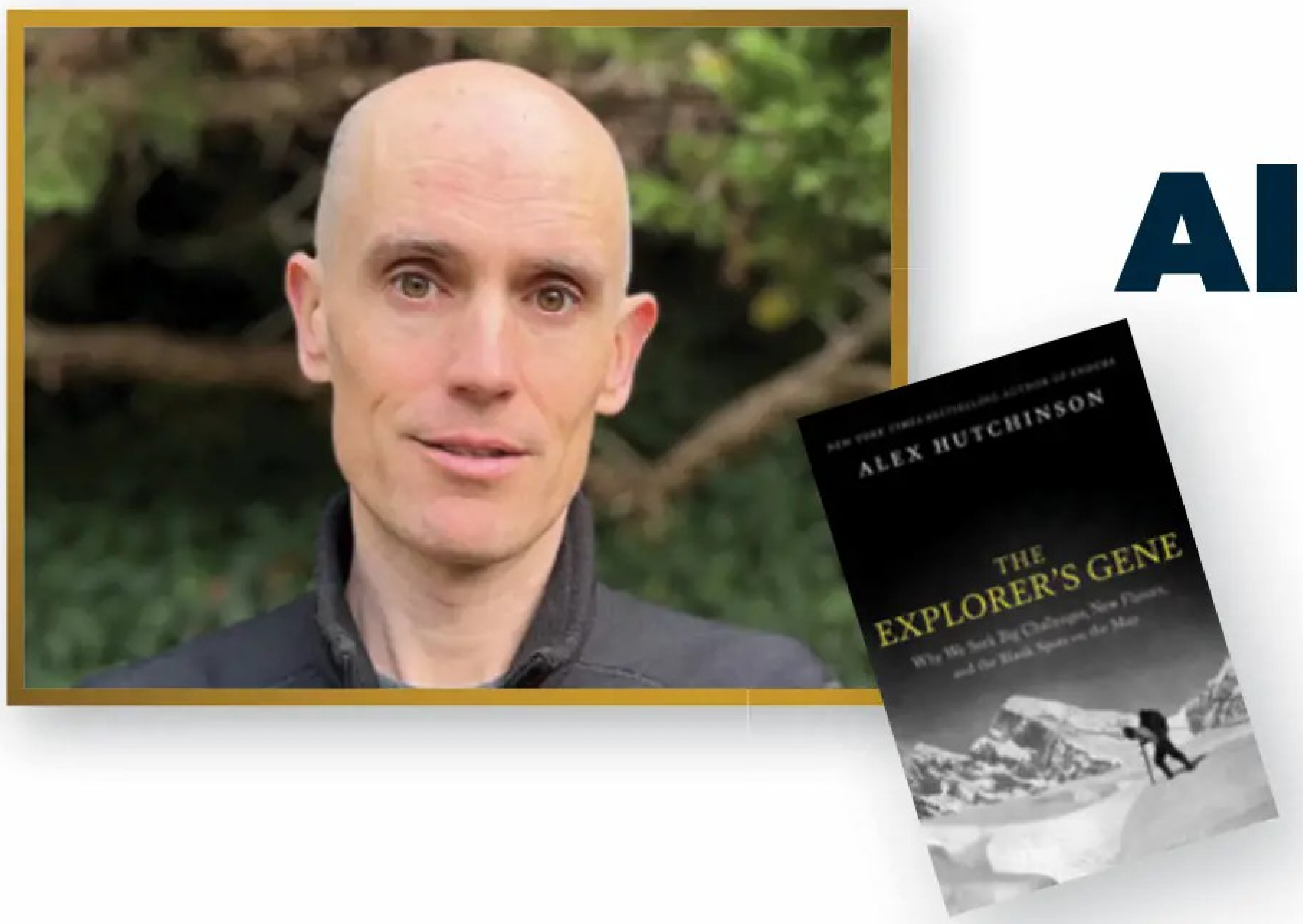
Meghan J. Ward

Wildflowers

Wednesday, March 19, 2025

Ray Zahab

Thursday, April 17, 2025


ALEX HUTCHINSON
THE EXPLORER'S GENE

Alex Hutchinson

The Explorer's Gene

Wednesday, May 14, 2025

CANGEO.CA/TALKS

ROYAL CANADIAN GEOGRAPHICAL SOCIETY

Canadian Geographic

Unfurling flags

Sixty years ago, the iconic Canadian flag was raised, but not before a fiery Great Flag Debate

BY **STEPHEN J. HARPER**

I WAS FIVE YEARS OLD when the Canadian flag, as we know it now, was hoisted above my Toronto school for the first time. I remember it vividly, the bright red maple leaf fluttering above Northlea Elementary School as my kindergarten class gawked from below.

An inquisitive kid, I had been intrigued by the options proposed during the flag debate that raged through 1964 and 1965. I naively decided to ask family, friends and neighbours which flag they preferred. Perhaps I should have known better; people talked to me, but they were clearly not talking to one another.

I expected opinions about symbols and colours. What I heard instead were views about whether Canada was even a country and if it was honouring or disgracing its soldiers. What I remember most distinctively was arguments about whether Canada already had a flag or not and, if it did, which flag: the Red Ensign or Union Jack?

Suffice to say, I came away more confused than I'd started. Emotions were strong and seldom about the design; it was really about identity, history and the collective narratives in which one believed.

As symbols, flags are permeated with historical meaning. The crosses on many European flags represent the Christian patron saints they chose centuries ago. The stripes on the American flag are for the 13 states that originally formed the union, while the 50 stars encompass those who have joined them since. The flag of Nunavut is dominated by the inukshuk — the stone figure the Inuit have used as a marker during their millennia inhabiting the Arctic.

Canada, and what it means to be Canadian, has been in flux for centuries. This land was home to Indigenous nations long before European contact. Then it became a French colony, then a British one. Waves of immigrants brought with them their own identities. That demographic complexity, and the slow process by which Canada became a united and independent country, meant the ultimate choice of a national banner long ran up against evolving, and differing, concepts of Canada.

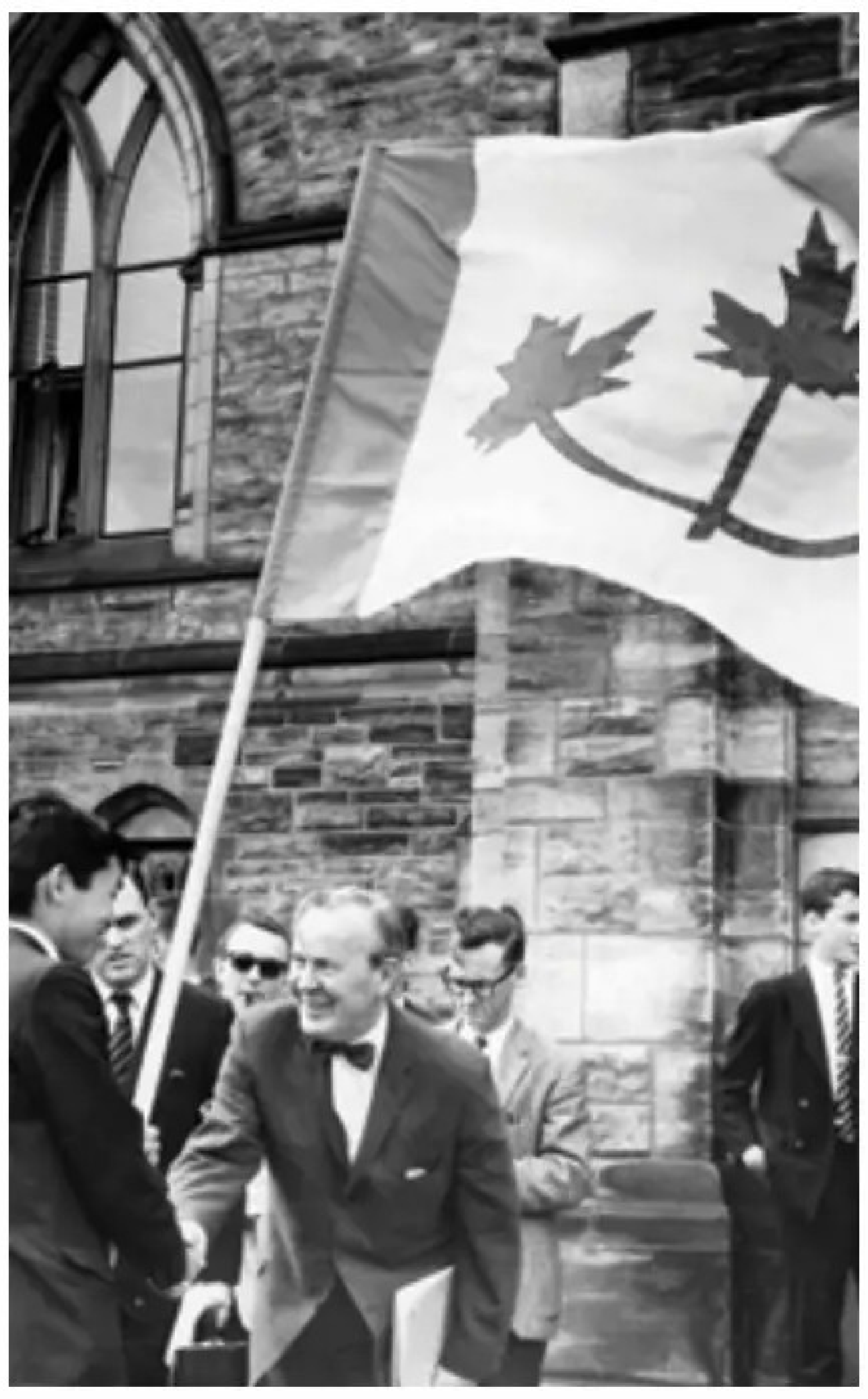
Those divergent perspectives made the flag debate that followed Lester B. Pearson's election as prime minister in 1963 the most intense in Canadian history. There were thousands of proposals. They ranged from those with familiar patterns and symbols to the absurdly abstract and clearly comical. One suggested the Beatles be added to our national banner. Objective polling was scarce, but the debate broke down into two broad camps: the traditionalists and the nationalists.

The traditionalist camp wanted to emphasize history, so it favoured flags that highlighted Canada's longstanding membership in the British Commonwealth. This group was dominated by those who favoured the Canadian Red Ensign, a red flag with the Union Jack in the upper left corner and Canada's royal shield in the fly that had been our unofficial banner for a century. Support was strongest among war veterans, who had fought under this flag. Others favoured the Union Jack.

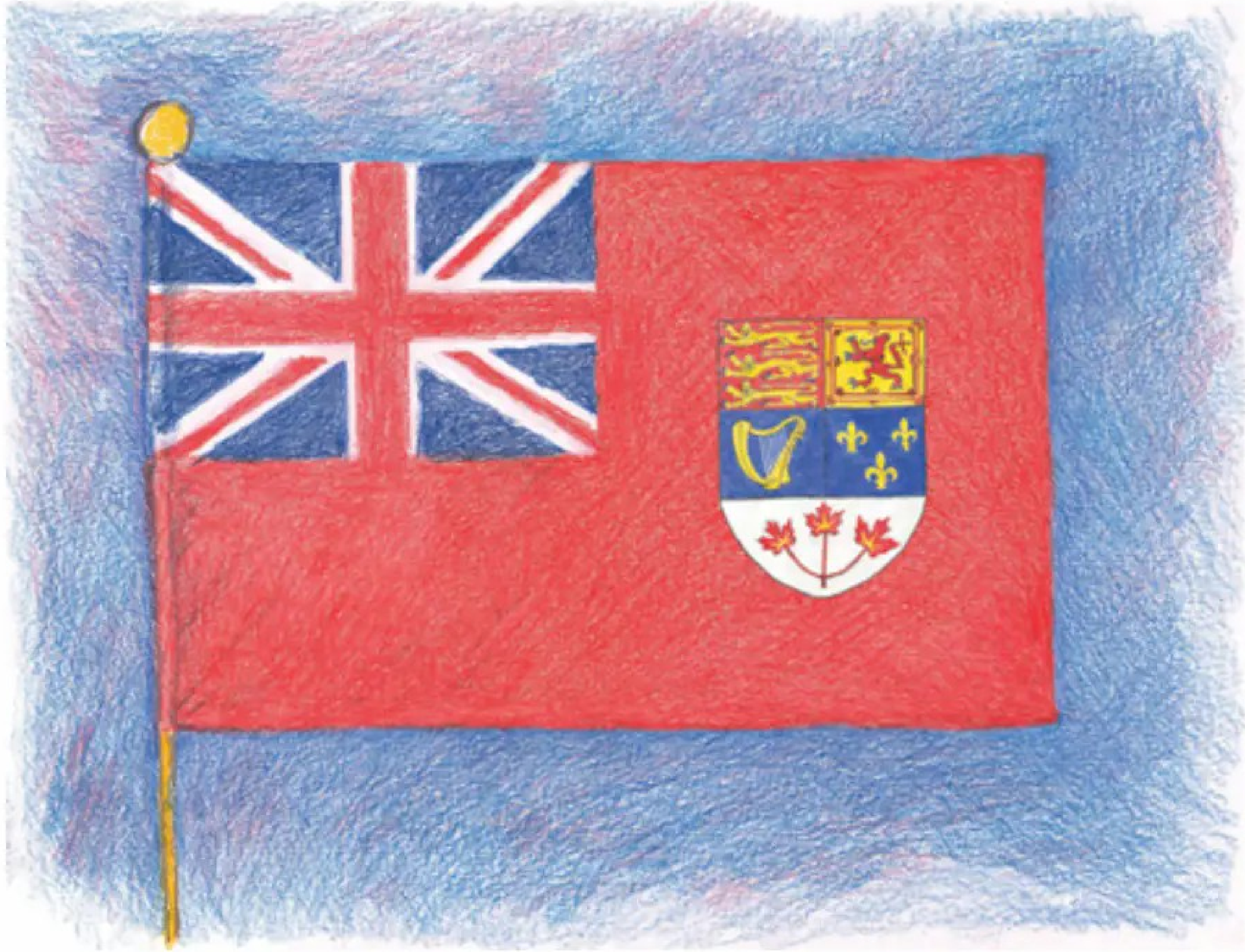
The nationalist camp wanted something new, something entirely "Canadian." While there were many ideas, the maple leaf emerged as a front-runner. The maple leaf as a symbol arose independently among Francophones and Anglophones in the early 1800s. Over the next century and a half, it appeared in poems, songs and on military uniforms and local banners. The leaf of the sugar maple was appealing because of its bold shape and multiple colours. The main drawback — it grew only in the southeastern part of British North America — made little difference. That is where almost all the colonial population then lived.

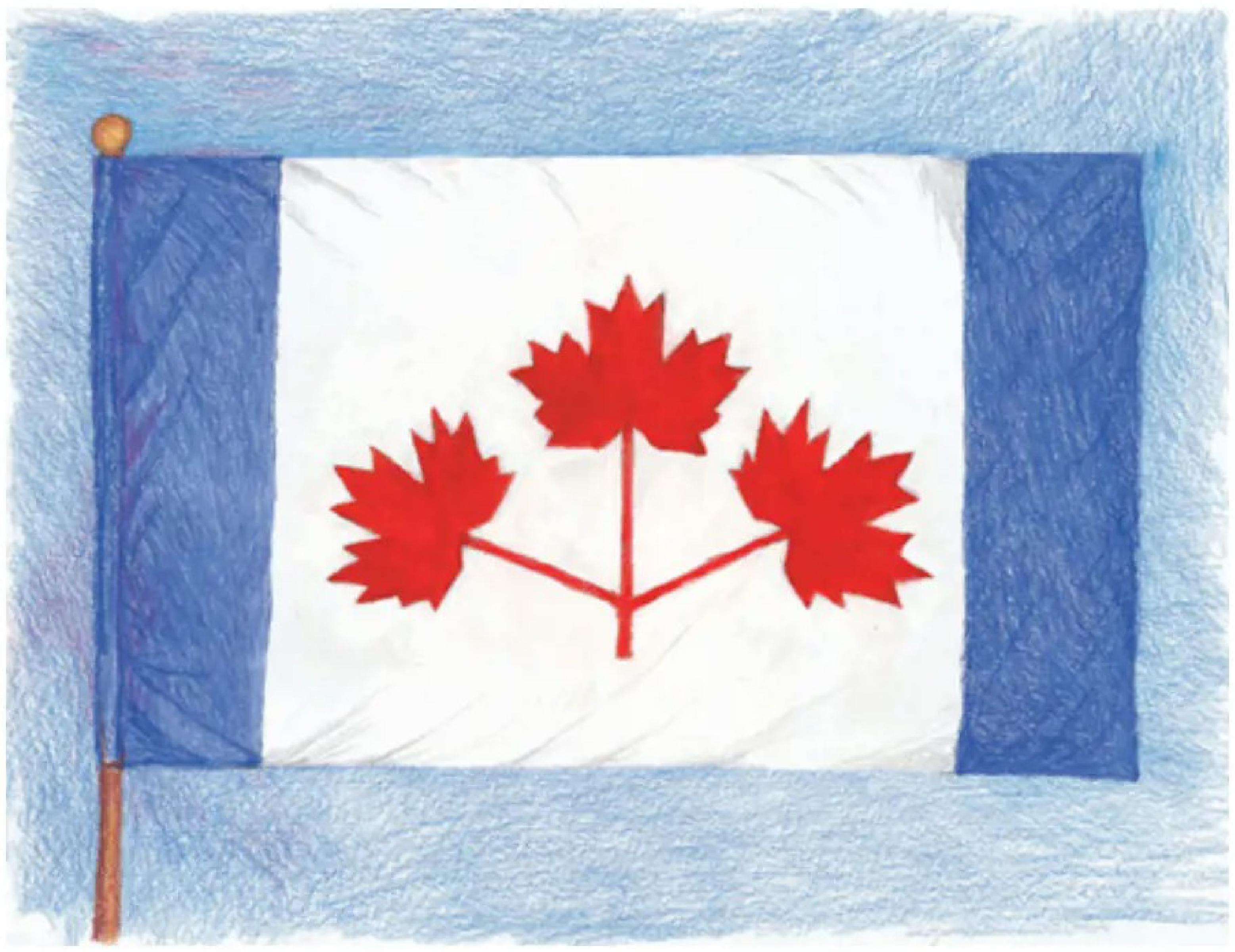
How the maple leaf would be incorporated into the flag was another matter. The "Pearson Pennant," put forward by the prime minister himself, featured three red maple leaves fanning out from the same stalk on a white ground between royal-blue bars. The other favourite was a late entry: inspired by the flag of the Royal Military College, where he was dean of arts, historian George Stanley sketched a design that replaced the college's emblem with a single red maple leaf flanked by red bars.

A game of politics kicked off in the parliamentary committee studying the options. Conservatives preferred the blue-bar design, but they secretly voted for the red-bar one to prevent a consensus on the prime minister's proposal. Liberals favoured the Pearson Pennant but privately thought it was too partisan. They also voted for the Stanley-inspired option. So, politics being politics, while everybody preferred the blue-bar pennant, the red-bar alternative passed unanimously.



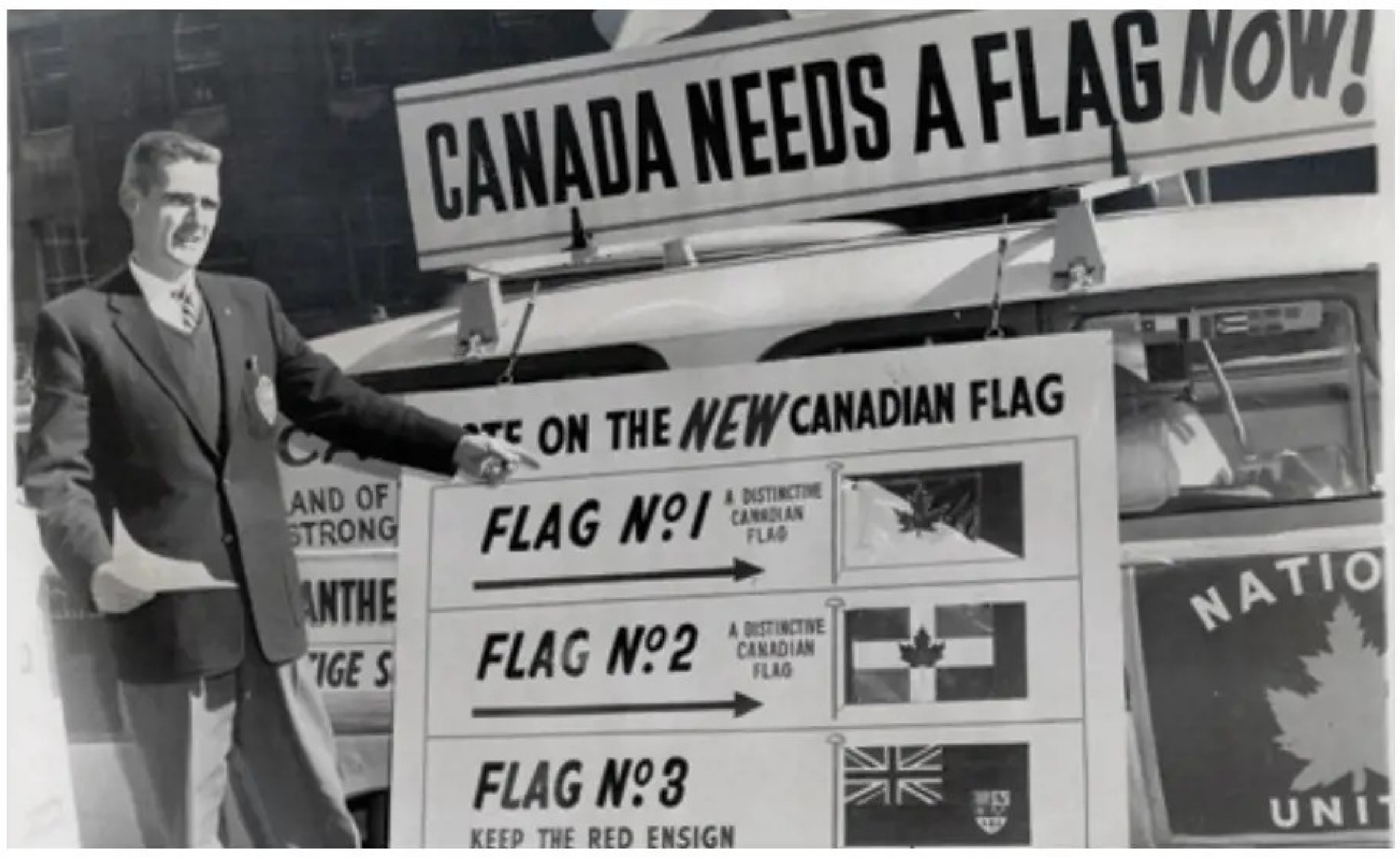
Clockwise from LEFT: Children pose with the Canadian flag in 1996; Prime Minister Lester B. Pearson with the "Pearson Pennant" in 1964; the "Pearson Pennant"; pollster John Heysel spent years advocating for a national flag; the Canadian Red Ensign.





The rest, as they say, is history. The first official national flag of Canada became law on February 15, 1965. Many years later, as prime minister, I would see the flag fluttering alongside those of many other nations. It holds up very well. Its pattern is strong, unique, and rooted in history. It has become the simplest and most elegant way to shout "Canada!" ⊛

The Rt. Hon. Stephen J. Harper was Prime Minister of Canada from 2006-2015. His latest book, *Flags of Canada*, is available now from Sutherland House Books.


CANADA NEEDS A FLAG NOW!
ON THE NEW CANADIAN FLAG
FLAG Nº1
A DISTINCTIVE CANADIAN FLAG
FLAG Nº2
A DISTINCTIVE CANADIAN FLAG
FLAG Nº3
KEEP THE RED ENSIGN
NATIO
UNI

CLOCKWISE FROM TOP LEFT: PETER POWER/TORONTO STAR PHOTOGRAPH ARCHIVE; THE CANADIAN PRESS; GREG STOICOIU; EDDIE ROWORTH/TORONTO STAR PHOTOGRAPH ARCHIVE; GREG STOICOIU

Water world

How beaver engineering results in biodiverse and climate-resilient landscapes

BY **ABI HAYWARD** AND **KATIE DOREEN**
WITH ILLUSTRATION BY **DAVID WYSOTSKI**

It starts with the sound of running water. There's something in a beaver's rodent brain that draws it to the sound, *compelling* it to build. To dam. To slow the flow. To hold that water in its little chunk of landscape a little longer. The beaver is following its instincts to build a home, with easy access to tasty morsels to gnaw on: aspen, willow, birch, maple. But it's doing something more. It's creating a more resilient watershed.

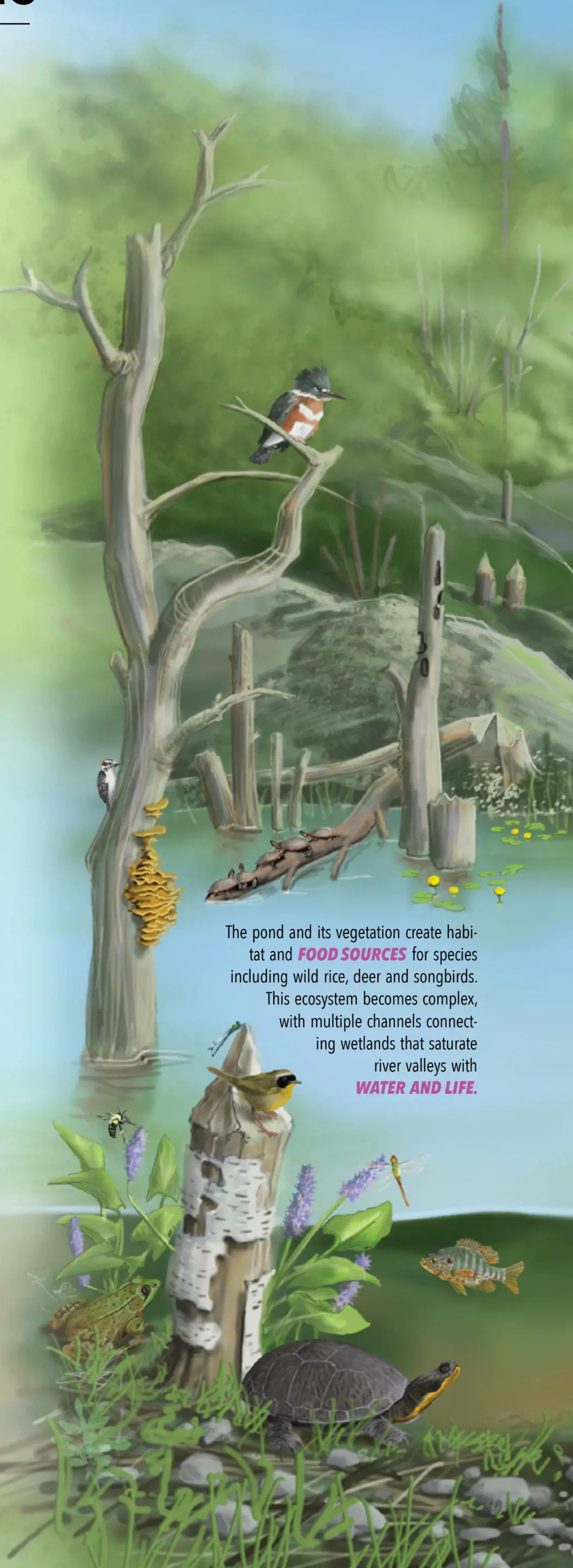
During the 1940s, a bizarre project saw beavers parachuted into Baugh Creek, Idaho, because they were seen as a nuisance in cities and towns. The beavers did what they do best and created a lush mosaic of ecosystems.

Seven decades later, in 2018, a wildfire swept through Baugh Creek. Satellite imagery showed a remarkable picture: that beaver-engineered, verdant valley appeared unscathed amid the wildfire-charred hills.

Researchers have found that beavers contribute more to keeping water in the landscape than climate, precipitation and temperature combined. As beaver dams slow water down, backing it up into ponds, this not only creates habitat for a biodiverse ecosystem but better protects the landscape from increasing droughts and fires that accompany warming temperatures associated with climate change.

Beaver dams also filter the water, which removes contaminants and moderates water temperature. When deeper beaver ponds "stratify," separating into layers, they create cool refugia for various fish species, which can attract protein-loving predators to beaver ponds. The nutrient-rich sediment and still water also cultivate plants for grazing herbivores. Ponds eventually give way to lush meadows as, once the beavers' journey to trees becomes too far, beavers abandon their dams to begin all over again somewhere else.

The resulting landscape is a patchwork of meadows and wetlands — with a range of ages and successional stages — that become more diverse as beavers repeatedly colonize and abandon their dam sites. With droughts, wildfires and flooding predicted to increase in Canadian landscapes, perhaps we can let beavers do what they do best: create resilient watersheds for the future. ❆



The pond and its vegetation create habitat and **FOOD SOURCES** for species including wild rice, deer and songbirds. This ecosystem becomes complex, with multiple channels connecting wetlands that saturate river valleys with **WATER AND LIFE.**

Biinaagami is a Can Geo collaboration connecting people with the Great Lakes-St. Lawrence watershed. Learn more at biinaagami.org

All the sediment filtered out of the flowing water serves to create **NUTRIENT-RICH** soils, which are ripe for the establishment of diverse herbaceous plants: the base for a new **THRIVING ECOSYSTEM**.

THE INITIAL FLOODING kills smaller plants and trees, but the gap created in the canopy then lets sunlight in, allowing algae, aquatic plants, fungi and shore-dwelling vegetation to thrive.

Beavers use sticks, mud and stone to build a series of dams that **SLOW THE FLOW** of water in a creek or stream.

Water is backed up behind the dam, creating a pond. These ponds are often not at capacity and can hold more water if needed, helping to **REDUCE THE RISK** of flooding downstream. The pond also filters out suspended sediments, another ecosystem service.

Dams trap woody and herbaceous material, which accumulates on pond bottoms, **CREATING HABITAT** for aquatic invertebrates, amphibians and fish such as juvenile salmon and steelhead trout.

ON THE MAP

Exploring Cartography

Mountain high

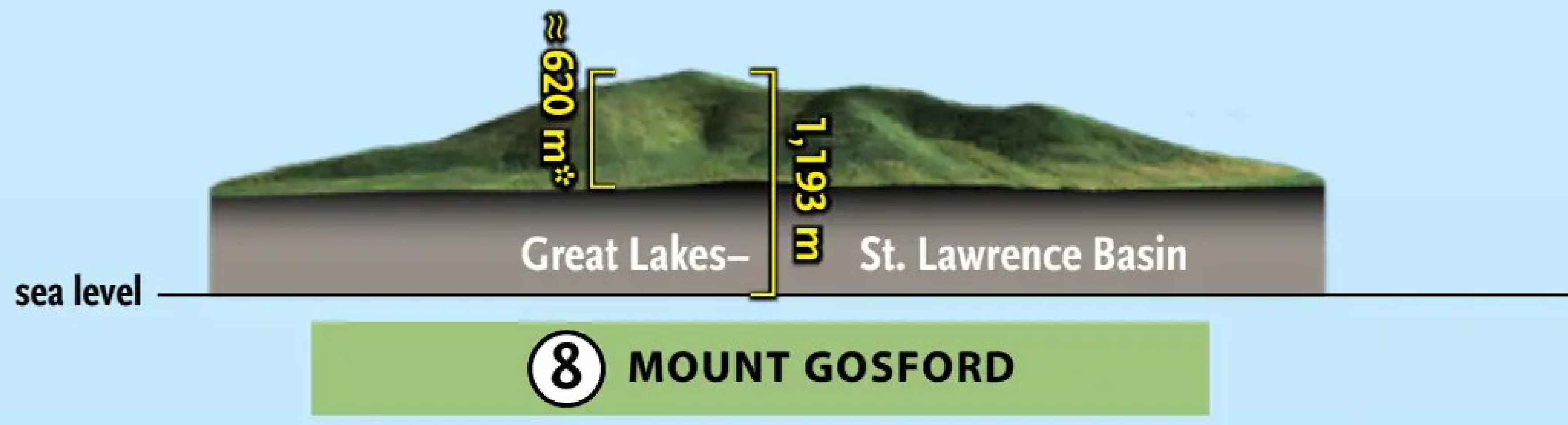
Comparing Canada's highest mountains and their role as watershed cornerstones

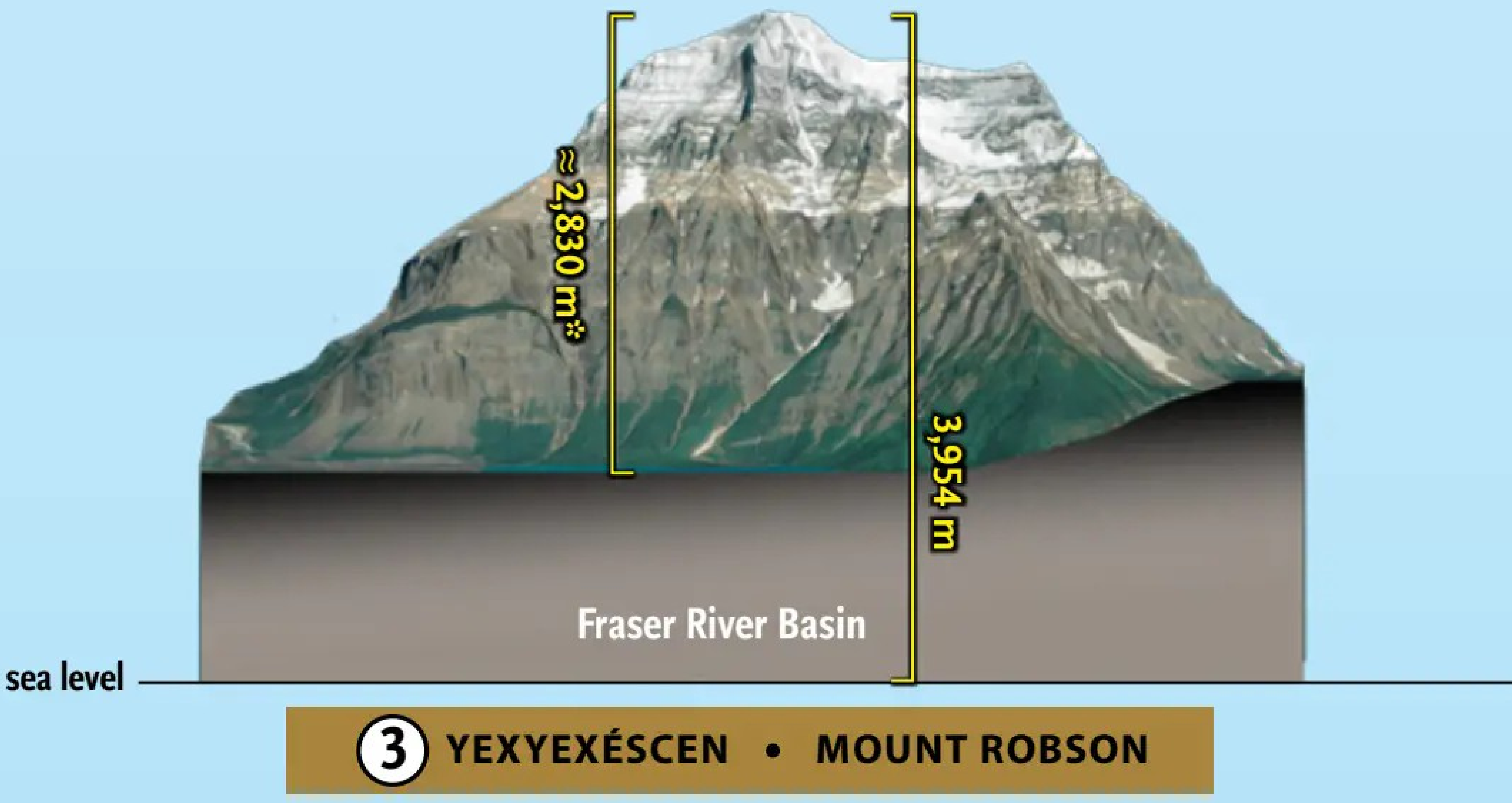
MAP BY **CHRIS BRACKLEY**
WITH TEXT BY **ZAC ROBINSON** AND **DAVID HIK**

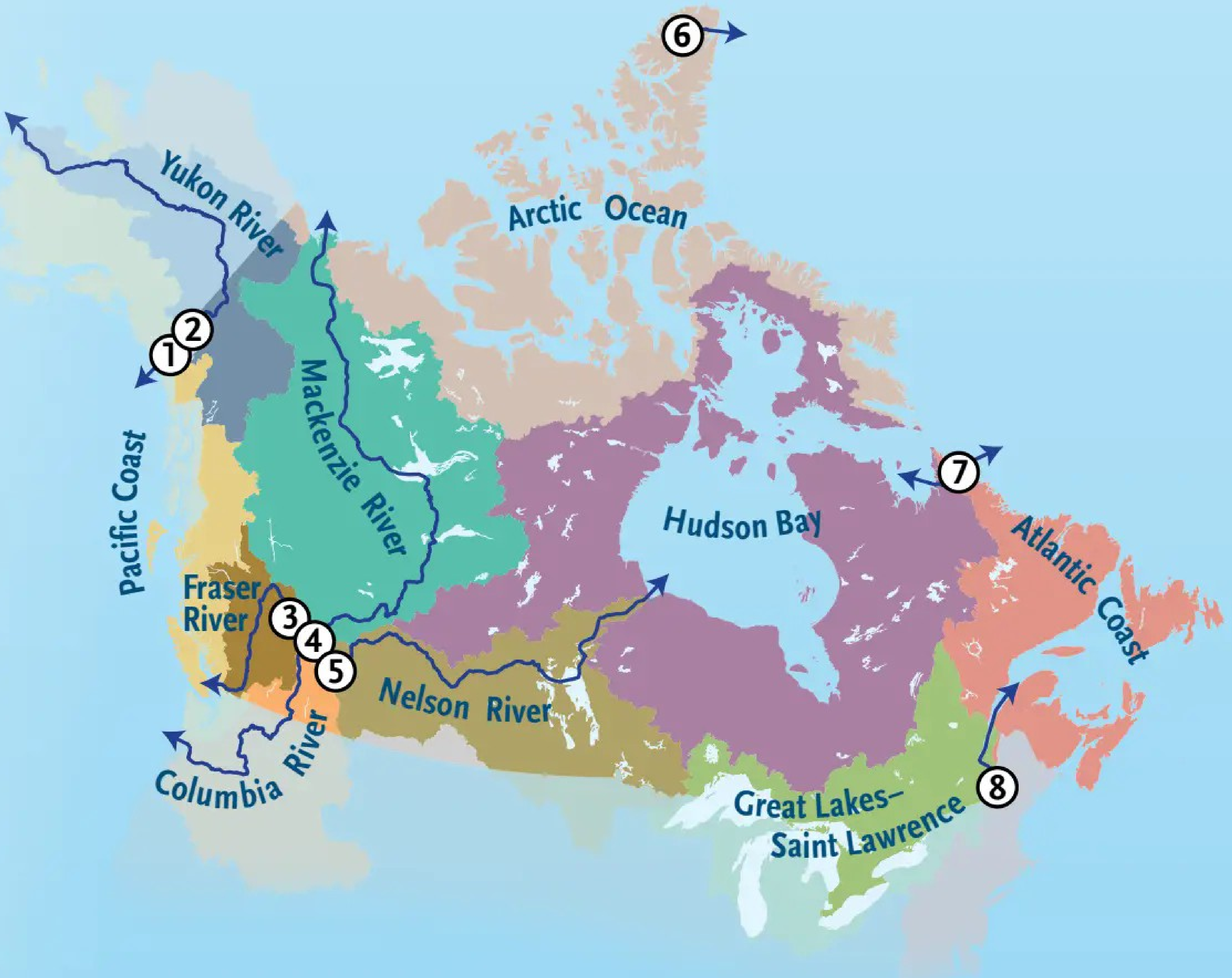
We've long been drawn to the highest mountains and their immensity of space, scale and verticality. Across cultures, they are sacred embodiments, sources of wealth and places of healing. We flock to them in droves. We protect them in parks. But to stand before a high peak, even on the clearest days, is to behold only the exposed portion of Earth's rocky monuments. Mountains are merely the uppermost remnants of deep crustal jostling eons in the making. Their roots run deep: far down beneath the ground to that imaginary line geologists call the "geoid" — where sea level would be if it somehow magically extended beneath and through the continents — and deeper still.

On the terrestrial tabletop, they sit assuredly at the head, with vast life-sustaining watersheds stretching out at their feet. The mountains at the headwaters of Canada's rivers and watersheds are guardians of ecosystems that are crucial for our well-being. Mountain glaciers and forests can reduce run-off and prevent flooding by retaining water, while simultaneously providing fresh water that we rely on for drinking and cultivating food systems. Understanding the interconnectedness of watersheds, from mountaintop to surrounding lowlands, is essential for protecting built-up areas, croplands and biodiversity. This connection is shown on this graphic, which shows Canada's highest peaks by drainage basin.

Seen this way, we are all connected to high mountains by the water carried in rivers and streams — above, across and beneath the land we call home — to the sea.

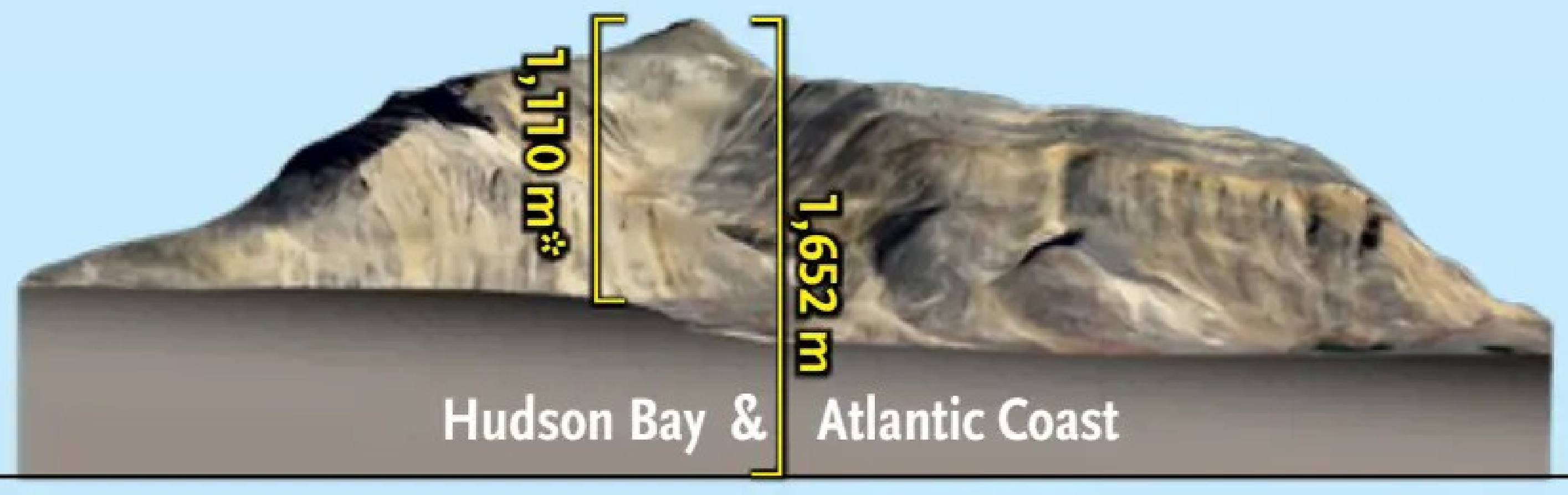

≈620 m*
1,193 m
Great Lakes–St. Lawrence Basin
sea level
8 MOUNT GOSFORD


≈2,830 m*
3,954 m
Fraser River Basin
sea level
3 YEXYEXÉSCEN • MOUNT ROBSON

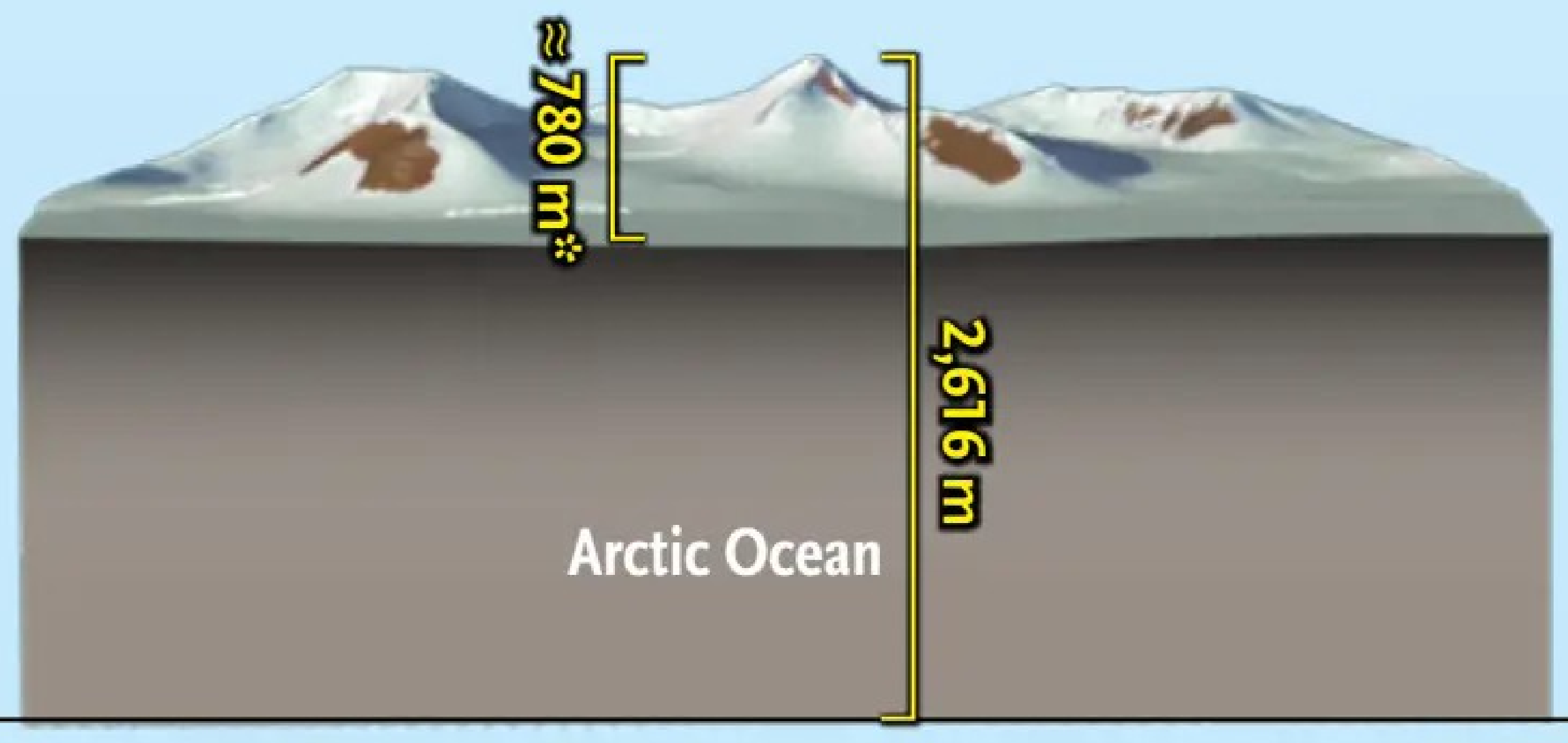

6
Arctic Ocean
Yukon River
1
2
Mackenzie River
Pacific Coast
Fraser River
3
4
5
Nelson River
Hudson Bay
7
Atlantic Coast
Columbia River
Great Lakes–Saint Lawrence
8

*These elevations represent the height from mountain peak to local ground level. Since "local ground level" is not uniform at a mountain's base, this value is an approximation.

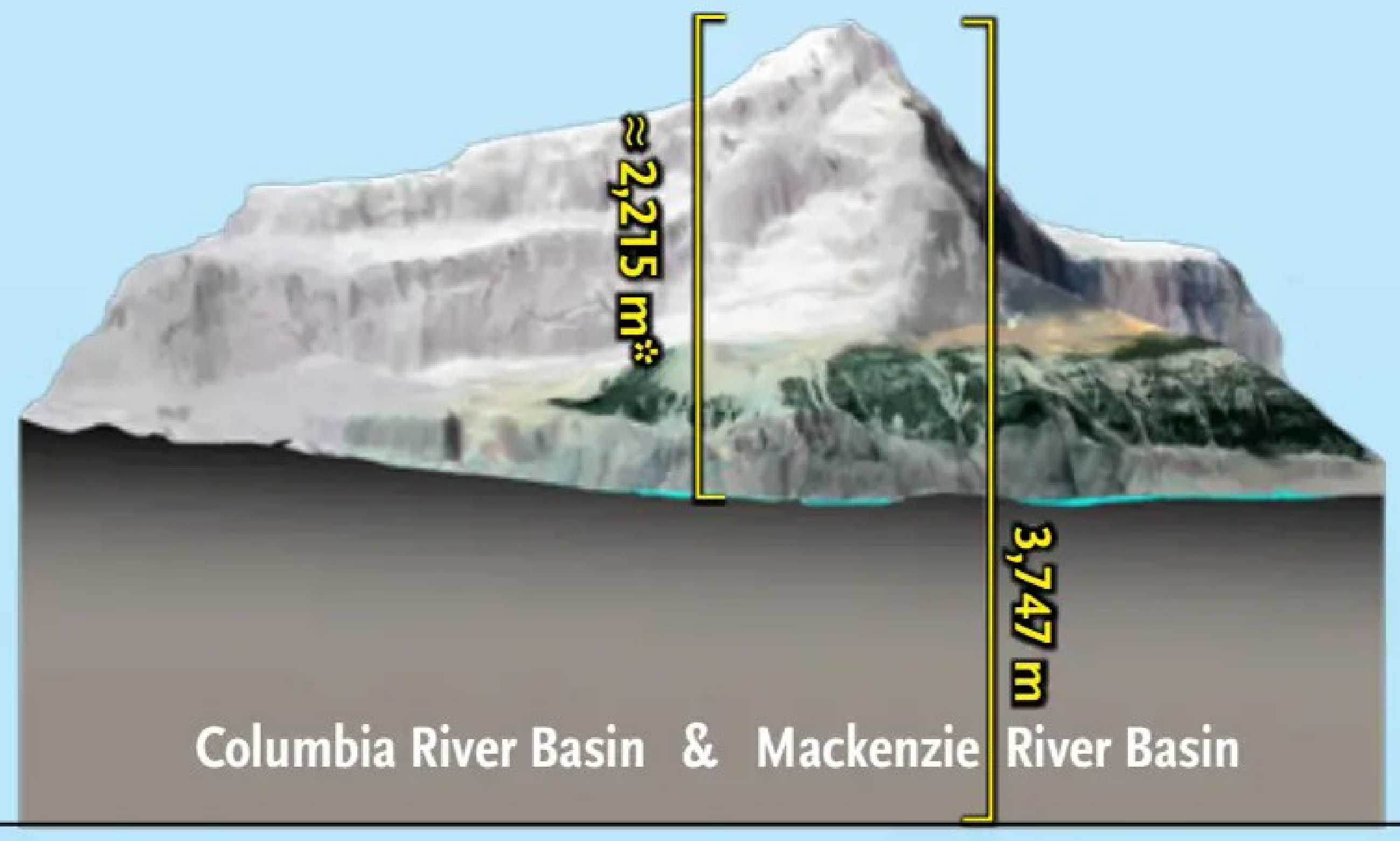
MAP DATA: CANADIAN DIGITAL ELEVATION DATA (CDED) @ 1:250,000; LICENSED UNDER THE OPEN GOVERNMENT LICENCE — CANADA. SHUTTLE RADAR TOPOGRAPHY MISSION (SRTM) 30M DATA: UNITED STATES GEOLOGICAL SURVEY. JAPAN AEROSPACE EXPLORATION AGENCY (JAXA) 30M DATA. IMAGERY: LANDSAT 8; COPERNICUS SENTINEL; GOOGLE EARTH, MAXAR TECHNOLOGIES


1,110 m*
1,652 m
Hudson Bay & Atlantic Coast

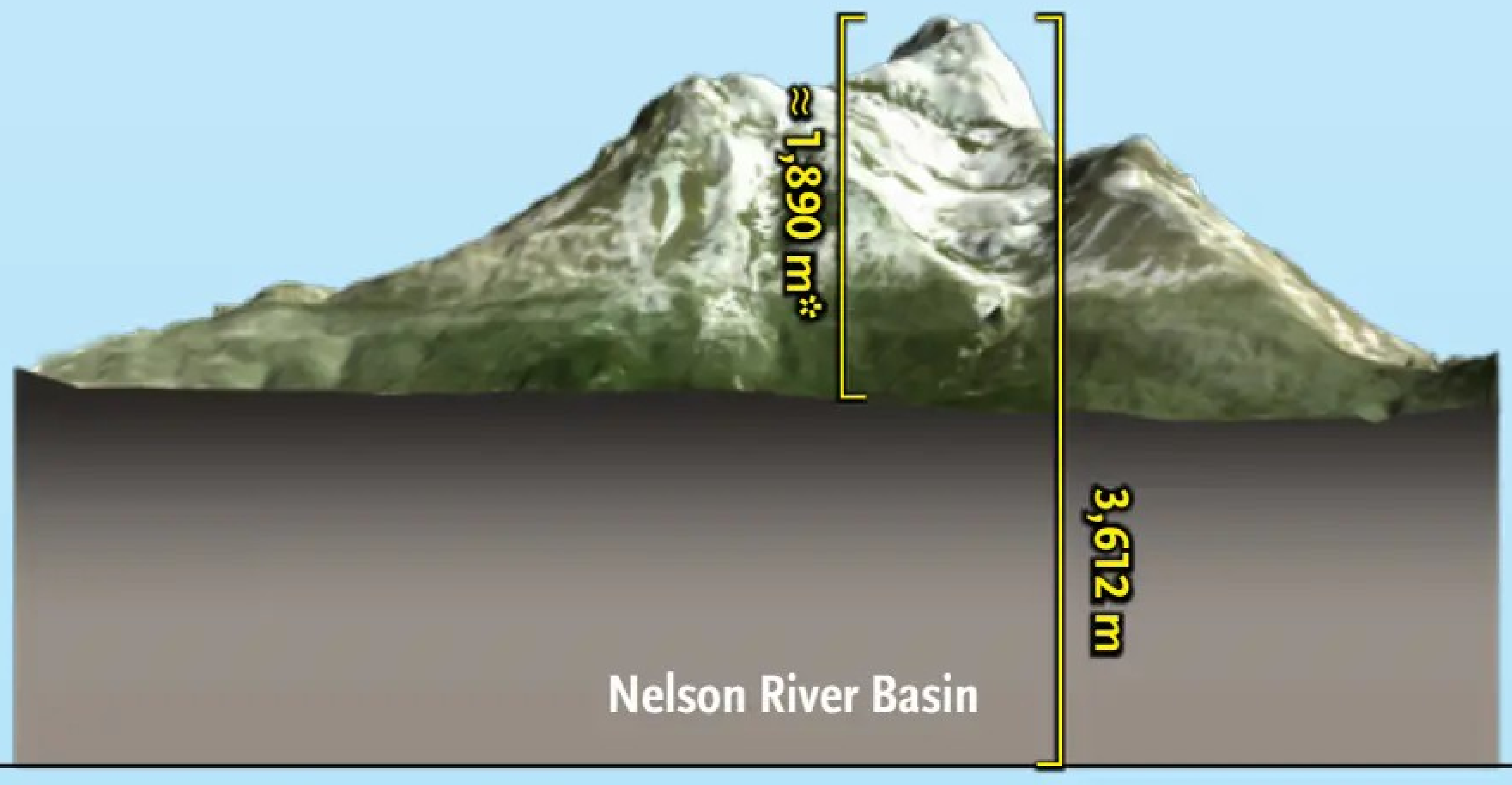
⑦ MOUNT D'IBERVILLE • MOUNT CAUBVICK


≈ 780 m*
2,616 m
Arctic Ocean

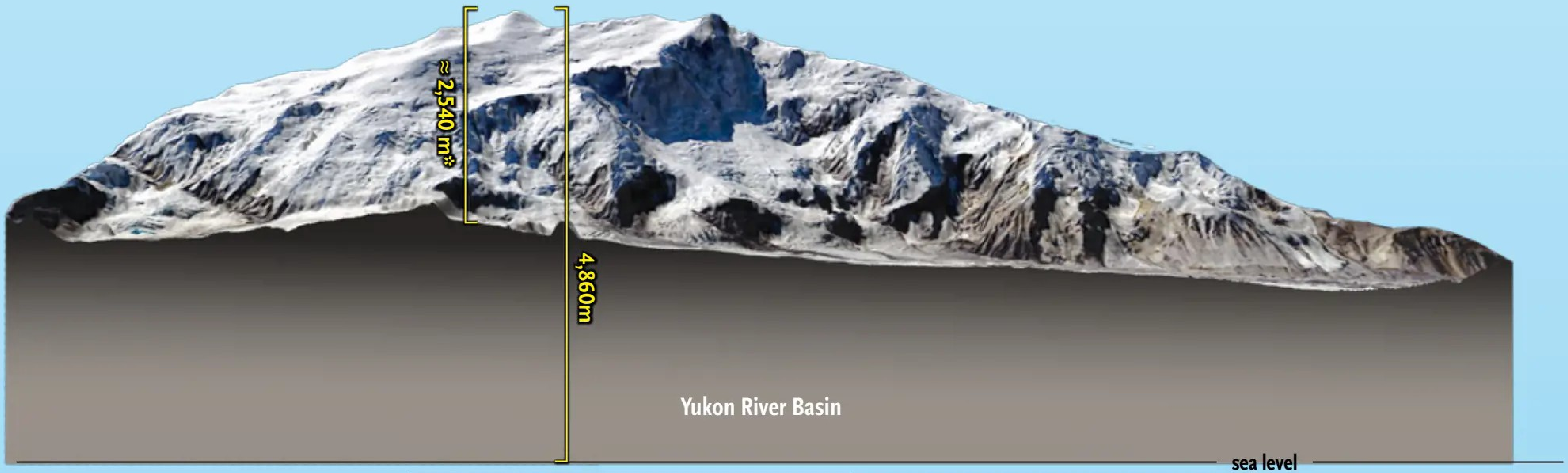
⑥ BARBEAU PEAK


≈ 2,215 m*
3,747 m
Columbia River Basin & Mackenzie River Basin

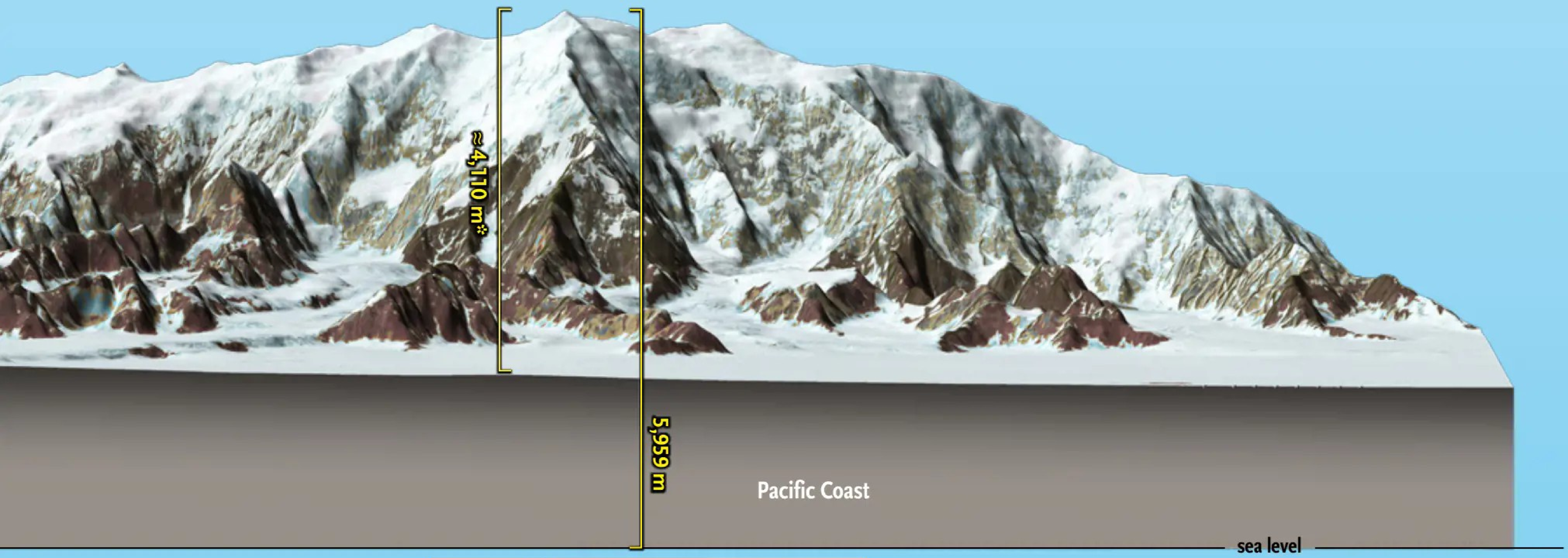
④ MOUNT COLUMBIA


≈ 1,890 m*
3,612 m
Nelson River Basin

⑤ MOUNT FORBES


≈ 2,540 m*
4,860m
Yukon River Basin
sea level

② MOUNT WOOD


≈ 4,110 m*
5,959 m
Pacific Coast
sea level

① MOUNT LOGAN

PRO PELLE CUTEM
Montréal 1976
5 CENTS
KG
CANADA
1937

The dam, the myth, the legend

AN EXPLORATION OF THE BUCK-TOOTHED, FLAT-TAILED, LANDSCAPE-SHIFTING ICON CELEBRATING 50 YEARS AS CANADA'S NATIONAL SYMBOL: THE BEAVER

BY **BRIAN BANKS**

MATTHEW BILLINGTON

IT STARTED, IRONICALLY, WITH AN AMERICAN. In January 1975, New York State senator Bernard Smith, a noted environmental champion, introduced a bill to officially recognize a new state animal: the beaver.

Prompted by a local newspaper columnist asking if Canada had a more deserving claim, Sean O'Sullivan, a 23-year-old Conservative member of Parliament from Hamilton sprang into action. O'Sullivan, the youngest-ever MP when first elected in 1972, drafted a one-sentence private member's bill — "An Act to provide for the recognition of the Beaver (*Castor canadensis*) as a symbol of the sovereignty of the Dominion of Canada" — that had its first reading in Parliament that same month.

On the bill's second reading, O'Sullivan spoke about why Canada needed to adopt the beaver as a national symbol. "There must be more to life than just financial facts and figures," he told the House of Commons. "There must be things to touch one's soul and heart and emotions, if we are to be complete persons and a whole nation. That is the importance of symbols." His fellow MPs and colleagues in the Senate agreed. On March 24, 1975, the National Symbol of Canada Act received royal assent.

This spring marks 50 years since the beaver reached this exalted status. Were O'Sullivan alive today, he'd surely be gratified by its persistent grip, literally and figuratively, on our collective soul and heart and emotions. Beaver imagery permeates every aspect of our culture: clothing, food, art, advertising, branding, entertainment. More than 1,000 places in Canada are named for the beaver. On the land, beavers continue to shape and reshape terrain,

in ways that are both challenging and instructive. They may even have a role to play in helping the country move forward with some of the most important issues of the day: reconciliation, halting biodiversity loss and coping with a changing climate. Little wonder that in a poll done for Canada's 150th birthday in 2017, the beaver was chosen as the "most Canadian" animal.

Yet commemorating this milestone is also a tricky task. The 1975 act may have given the squat, brown, furry, flat-tailed, buck-toothed, dam-building rodent official national symbol status, but by then the beaver's potency as a national icon was already deeply entrenched, some of it predating Canada's creation by centuries. Parliament declaring it just made it official.

Much of that earlier imagery was directly tied to Canada's colonial history. Beavers were the prized commodity that drove the fur trade, propelling Europeans ever deeper into the interior to collect pelts to make fashionable men's hats back across the Atlantic. The Hudson's Bay Company's coat of arms, presented in 1671, a year after the company's founding, sports four beavers. Canada's first postage stamp, issued in 1851, 16 years before Confederation, was the Three-Pence Beaver; it was based on a sketch of the beaver by Sandford Fleming (no small figure who also invented time zones and engineered some of Canada's early railways).

Part of the story stretches back even further. The beaver — *amik* to the

Beavers "R" Us

In the last 75 years, Canadians have embraced the beaver as a symbol of our identity in countless ways. Here are six.

Aircraft: In 1947, de Havilland Canada unveiled the Beaver, a single-engine, all-metal bush plane, designed for short takeoff and landing on skis, wheels or floats. Nearly 2,000 were built, with sales to 62 countries. In 1987, the Beaver was named one of Canada's top 10 engineering achievements of the 20th century.

A beaver swims beneath the ice in a frozen river in Quebec (LEFT). The species can hold its breath for up to 15 minutes. A beaver (RIGHT) carries sticks back to its lodge in the Meewasin Valley in Saskatoon, Sask.

CLOCKWISE FROM TOP LEFT: NATURE PICTURE LIBRARY/ALAMY STOCK PHOTO; KELVIN AITKEN;
SIDEBAR: BEAVERVENDING.COM; ROBERT FROLA/WIKIMEDIA COMMONS; BACKGROUNDS BY MATTHEW BILLINGTON

Anishinaabe, *amisk* to the Cree — and beaver imagery, that of the ubiquitous, wise and resourceful landscape engineer have been part of Indigenous traditions and teachings on this continent for millennia. The beaver is the "one that brings the water," as described by Michi Saagiig Nishnaabeg writer Leanne Betasamosake Simpson in *A Short History of the Blockade: Giant Beavers, Diplomacy, and Regeneration in Nishnaabewin*. Indigenous Peoples in North America also invented the canoes that were adapted and exploited to become the main vehicles of the fur trade. And these two Canadian symbols, the beaver and the canoe, have been intimately linked since.

* * *

ANOTHER COMPLICATING FACTOR: Beavers may be the "most Canadian" animal, but that doesn't mean they're the most popular. Often, the emotions they stir are frustration and anger.

"They'll cut down the birch trees in your front yard, flood farmland, put water over the top of roads," says Ojibway wildlife biologist and artist Rick Beaver, of the Alderville First Nation in Ontario. "Here on the west end of our reserve, there's a nice, beautiful culvert that funnels Stoney Creek down into the marshland into Rice Lake. And every spring, the beavers have got that just plastered full of mud and logs. They keep the township and counties busy making sure that the water still flows."

As a keystone species that protects groundwater and creates unique wetland and riparian forest habitat for everything from moose and deer to amphibians, insects and other furbearers, beavers "need to be here," he says. "But that's a hard thing to explain to a property owner who has lost road access or a farmer who has lost part of his acreage to floods."

The cost to manage the beaver's impact in Canada each year is substantial. Glynnis Hood, professor emerita of ecology at the University of Alberta and author of *The Beaver Manifesto*, did a study in 2018 that found municipalities in Alberta spend more than $3 million annually on beaver-related repairs and

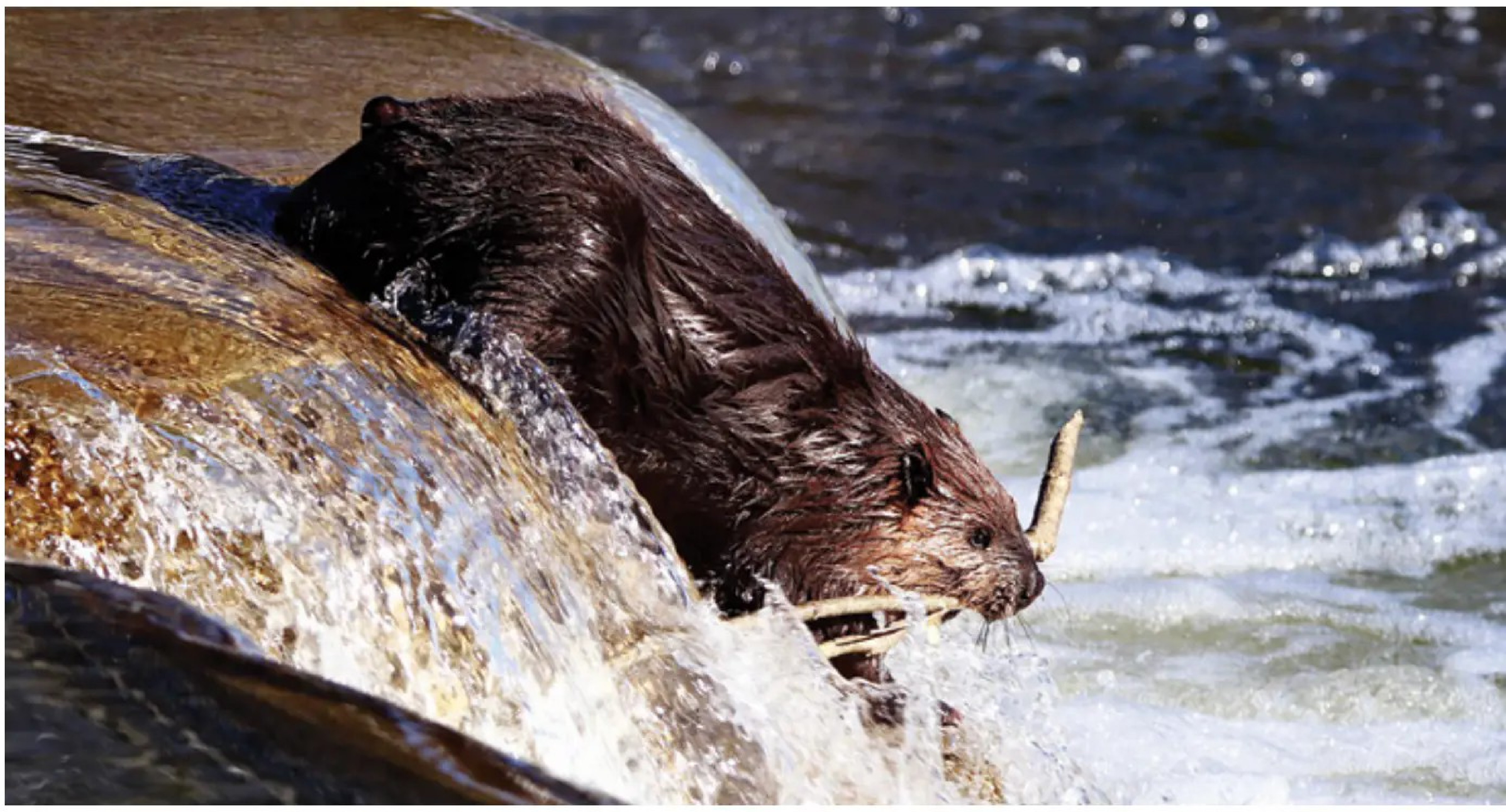
Vending machines: For kids in the 1960s, the word "beaver" was synonymous with candy dispensers with glass globes and metal crank coin slots made by a company called Machine-O-Matic. Founded in 1963, it first made parts for other manufacturers, then launched its own machine, the "Round Beaver 16," in the mid-'60s. It was renamed Beaver Machine Corp. in 2000.

flood mitigation. And that's "a conservative estimate," she says. "You've got an animal that will engineer no matter what it sees. I've seen beavers chew into fibre optic lines. I've seen PVC pipe incorporated into their lodges. They will take whatever is useful to them."

This conflict takes its toll on beavers, too. Many provinces and municipalities offer beaver "bounties" to keep their numbers in check, with tens of thousands killed annually.

If putting bounties on a national symbol sounds wrong, at least there's this: beavers are problematic only because they've made a spectacular recovery from near-extinction at the beginning of the last century. Estimates of the beaver population when Europeans first arrived in North America run anywhere from 100 million to 400 million. But after 300 years of the fur trade, wars between Indigenous nations, the French, the British and the Americans, and then land clearance and drainage for agricultural settlement, beavers were wiped from much of the continent. Today, Canada's beaver population is estimated at six million to 12 million — a healthy

Entertainment: In the early 1970s, lawyer-comedian Hart Pomerantz played the Canadian beaver in a series of CBC TV specials made with partner Lorne Michaels, before Michaels went on to launch *Saturday Night Live*. On the west coast, Ontario-born Judith Stein launched a 40+ year burlesque career while at the University of Oregon. Known as "Mama Beaver," she was the first Canadian inducted into the Burlesque Hall of Fame in Las Vegas.



A large lodge (LEFT) rules a flooded marsh in Lake of Bays, Ont. A busy beaver slides over a small waterfall (RIGHT) in the Speed River, Guelph, Ont. A beaver stands (BOTTOM, RIGHT) at the edge of a frozen Beauvais Lake, Alta.

CLOCKWISE FROM TOP LEFT: COLIN BRUCE; BRENDA DOHERTY; SHANE TURGEON; ROOTS CANADA LTD.; LEAGUE OF EXOTIQUE DANCERS/STORYLINE ENTERTAINMENT

total, though still a fraction of their numbers pre-Contact.

Beavers were so scarce by the early 1900s that trapping was banned or restricted in many areas. At the same time, the early vestiges of the conservation movement were also taking shape. When the Dust Bowl hit in the 1930s, turning the Great Plains into a virtual desert, some connected the dots between the extreme drought and the loss of beavers and their role in enhancing wetlands. In the 1940s, beaver reintroduction programs became common on both sides of the border, including high-profile destinations like Elk Island and Wood Buffalo national parks, where they arrived by rail and air, respectively. “Part of it was in response to the drought, and part of it was a response to the idea that we’d pushed nature too far,” says Hood.

* * *

THE BEAVER’S GRADUAL RECOVERY as a species and its emergence as a symbol in 20th-century Canadian culture were closely linked, with major Canadian institutions setting the tone. From 1886 to 1929, the Canadian Pacific Railway’s logo included a beaver (added shortly after Donald Smith, co-founder of the railway and Hudson’s Bay Company governor, was immortalized as the driver of the Last Spike in 1885); Parks Canada (then the Dominion Parks Branch of the Department of the Interior) unveiled its first beaver logo in 1933; and in 1937, the Royal Canadian Mint issued a new Canadian nickel with the same image of a beaver on a log that is still in circulation today.

Then there was Archibald Belaney, the English conservationist who falsely claimed his mother was Apache and

Roots

Fashion: Two years before the beaver became an official symbol of Canada, Michael Budman and Don Green launched Roots, first to sell shoes, then other clothing. The company’s iconic beaver logo was designed soon after, but only introduced chain-wide in 1985. The Roots logo achieved true Canadiana cred when the company outfitted Canada’s Olympic team for the 1998 Winter Games in Nagano.

later adopted the name Grey Owl when he began writing about beavers and conservation. After his death in 1939, Belaney's fraud was exposed. But in life, he helped put *Castor canadensis* on the map as a symbol of Canadian culture. His fame peaked after he was hired by the Parks Branch as "caretaker of park animals" in 1931 and lived for several years in Prince Albert National Park in Saskatchewan. There, he, his Algonquin-Haudenosaunee wife Anahareo and their pet beavers, "Rawhide" and "Jelly Roll," hosted a steady stream of visitors. "People came in droves," says Hood.

In the decades that followed, Canada boomed. And so did our continued embrace of the beaver, in commerce, performance, even athletic competition (see sidebar). However, learning, or in some ways re-learning, how to live with the beaver has been a slower process. Yet it's one area where some say

Fast Food: Would any other country invent a fast-food item made of fried dough flattened and stretched to resemble beaver tails? The first BeaverTails shop opened in Ottawa in 1980. It served its most famous customer in 2009, when U.S. President Barack Obama dropped in en route to the airport. It now has 140 franchise and licensed locations in six countries.

BEAVERTAILS
PASTRY

Clockwise from TOP LEFT: A beaver and its young share a meal in Forillon National Park, Que. Young beavers stay in their parental colonies for two years; in mid winter, a beaver uses its strong and constantly growing teeth to chew through a small tree on Oxtongue Lake, Ont.; the photographer spotted this beaver crossing a road to a small pond in Lac La Biche, Alta., in early May; *Castor canadensis* on the banks of the Ottawa River during a spring sunset.

OPPOSITE, CLOCKWISE FROM TOP LEFT: JÉRÉMIE LEBLOND-FONTAINE; COLIN BRUCE; DONNA FELEDICHUK; MARK BERNARDS. SIDEBAR, LEFT TO RIGHT: THE CANADIAN PRESS/JUSTIN TANG; THE ORGANIZING COMMITTEE FOR THE GAMES OF THE XXI OLYMPIAD, MONTRÉAL 1976

greater urgency is needed — and with it, a new way of looking at the beaver and what it might symbolize — as impacts of climate change, particularly drought, more intense rainfall and warming of the Far North, grow more severe.

Consider drought and Simpson's description of the beaver as "the one that brings the water." Glynnis Hood came to see what this meant while doing PhD research in Alberta in 2002. "We had the worst drought on record. I happened to be doing field data collection, and I was like, 'these ponds are disappearing.' Then I started to notice that the ponds with beaver still had water in them." Further study across the province revealed that ponds with beavers had nine times more open water than those without.

The difference is due partly to dams. But another beaver skillset is equally important: they excavate pond bottoms and dig canals into the surrounding landscape. "In certain types of wetlands, they dig kilometres of canal systems," says Hood. When there's rain after a drought, it's these canals that bring the water.

At the other extreme, these same beaver-engineered landscapes also show a capacity to reduce severe flash floods caused by intense rainfall. In 2013, when Calgary suffered its worst flooding in over a century, Cherie Westbrook, an ecohydrology professor at the University of Saskatchewan who had been doing field work in the Kananaskis region, discovered it could have been even worse were it not for the beaver dams upriver from the city.

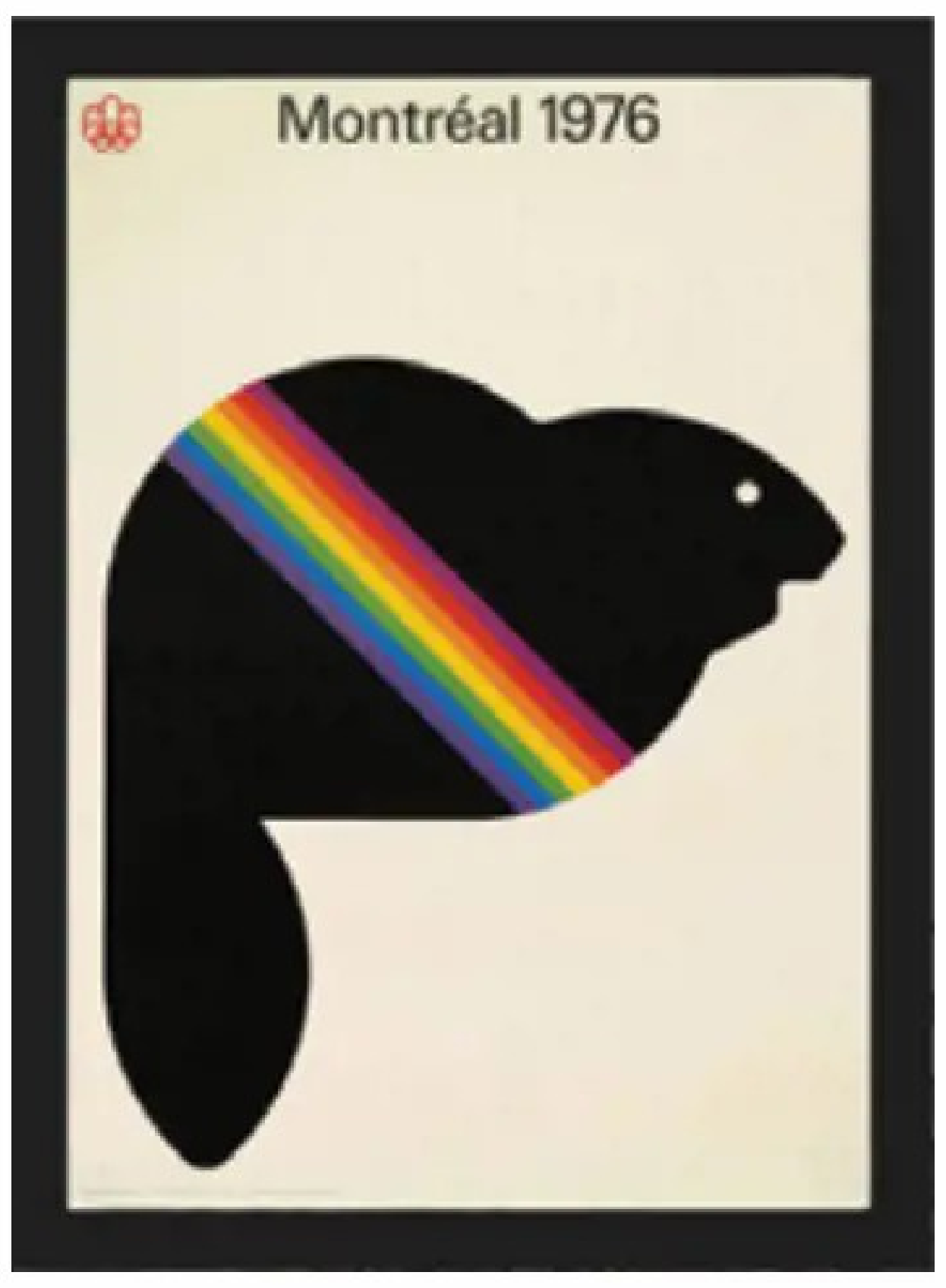
Canada boomed and so did our embrace of the beaver, in **COMMERCE, PERFORMANCE,** even **ATHLETIC** competition.

Despite the deluge, roughly seven of every 10 of those dams upriver remained intact and were still holding back water after the storm. Today, Hood and Westbrook are doing joint research to learn more about this capacity. Hood says conventional wisdom still argues for beaver dam removal in the belief that they will all give way in storms, making flooding worse. "We're trying to put a scientific evaluation on that, rather than just a rhetorical one," she says.

That's not to say there isn't a place for some simple human engineering to make coexisting easier. One solution: pond-levelling devices that regulate water levels in beaver ponds to prevent uncontrolled flooding, eliminating the need for dam removal or killing beavers. They also counter the beaver's instinctual drive to dam up any place where they hear running water by using submerged pipes called "beaver deceivers." Hood partnered with an economist to do a cost-benefit analysis comparing their use to tearing up dams with backhoes or dynamite. "We found that they saved tens of thousands of dollars," she says, while also preserving all the ponds' ecological benefits, which also include carbon storage and, in some areas, reducing wildfire risk.

The changing climate also means beavers are moving farther north as the limits of shrub and tree growth extend poleward. Researchers are working with Inuit in northern communities to better understand how the beaver's outsized impact will affect permafrost, fish populations and other local ecosystems. Right now, those outcomes are unknown.

For his part, Rick Beaver sees a solution to the broader question of coexistence with the beaver in Canada's growing willingness to seek



Olympic Mascots: When they're hosting the world, what countries choose as Olympic mascots says a lot about their national identity. So it was that Amik the beaver was selected for the Summer Games in Montreal in 1976. In Vancouver in 2010, the official mascots were characters melding local wildlife with First Nations stories and mythologies. But beavers still got their due. Corporate sponsor Bell Canada ran ads before the games featuring animated talking beavers (Frank and Gordon in English Canada; Jules and Bertrand in Quebec). Oversized versions also appeared in the closing ceremonies, described in the moment by NBC announcer Bob Costas as "the always enjoyable giant inflatable beavers."

Two beavers sit on the banks of the Bow River in Calgary at sunset.

JAMIE BUSSEY

Indigenous cooperation and heed Indigenous traditional knowledge in dealings with the environment. “It’s a question of acknowledgment that we are part of the landscape, as are beavers.”

“There is an Ojibwe word for the relationship of all things,” Beaver continues. “It’s Gidinawendimin. It means we are all related, that there’s this holistic identity that we are a part of. And as we consider solutions to current environmental issues, one of our objectives is to get back to that, to make people aware of their belongingness to all things. In that sense, I think it’s appropriate to think of the beaver as a national symbol which harkens back to our traditional teachings about who we are, and what we belong to and what belongs to us.”

Brian Banks (🦋@brianbanks.bsky.social) is an Ontario-based writer, editor and advocate for nature, science, animals and conservation.

ROM

EXHIBITION ON NOW
Tickets at rom.ca

Wildlife
Photographer
of the Year

Exhibition developed by

Natural
History
Museum
London

SUPPORTING SPONSOR

G Adventures
small group travel

Image: ***As Clear as Crystal*** © Jason Gulley. *Wildlife Photographer of the Year* 2024. ROM is an agency of the Government of Ontario.

The Crowfoot Glacier viewed from the Icefields Parkway shows tremendous change from the original image taken around 1907.

NATURE MEANT US ALL TO BE *wildflowers*

A JOURNEY OF FRIENDSHIP, LOSS AND HEALING IN THE FOOTSTEPS OF EARLY 20TH-CENTURY MOUNTAIN EXPLORER MARY SCHÄFFER WARREN

BY **MEGHAN J. WARD**
PHOTOGRAPHY BY **NATALIE GILLIS**

Jane Marshall, Meghan J. Ward and Eva Anandi Brownstein (ABOVE, back to front) hike along Poligne Creek in Jasper National Park. A moment of peace (OPPOSITE, LEFT) on Maligne Lake. Ward (OPPOSITE, RIGHT) approaches Maligne Pass.

I can hear the river now, a white noise dulling the morning bird song. It's a sign that my companions and I are approaching the crux of our through-hike: the fording of the Maligne River. The wooden bridge that once aided safe passage has washed up on the riverbank; we already know this as we approach the crossing. Parks Canada decommissioned this trail in Jasper National Park to protect grizzly and woodland caribou habitat but still issues one camping permit each night in the official campgrounds in the area. The lack of maintenance is apparent in the overgrown vegetation and crumbling infrastructure. So far, nearly every bridge along this trail has cracked down the middle or been swept away. We secured the permits and timed our trek for late August to ensure the water level would be low enough for us to cross the river safely.

Willow shrubs scrape our shoulders as we approach the river. Behind me is cinematographer Eva Anandi Brownstein — Anandi to our group — while hiking ahead are fellow cast members Jane Marshall and Natalie Gillis, who is also our expedition photographer. We are in the Maligne River valley to retrace Mary Schäffer Warren's 1908 journey to Maligne Lake for a documentary film about the trailblazing mountain explorer. I can't see Jane and Natalie, but I hear a *thwack* each time they pass through the stubborn, woody greenery. I keep my eyes on the narrow track of trampled earth, wide enough for one boot. Soon, the sea of willows gives way to a broad valley, now bathed in sunlight. I can see the Maligne. We gather by the river's edge, grateful for the rising air temperature as we gaze upon the frigid, glacier-fed water. It's about six metres to the other side.

A lot hinges on this crossing. We must make it across to complete our journey to the turquoise treasure downstream.

Through her writing, photographs and cartography, Mary became inextricably linked to the history and lore of this place. I can't meet her, so I want to connect with her by visiting the birthplace of her legacy and watch the scenery unfold as she'd encountered it.

There is only so much I can read about or research; here is the opportunity to lift Mary's words off the page and live them.

WHEN MARY Schäffer Warren travelled through the Maligne River valley, 115 years before our crew, she was looking for an elusive lake she'd heard referred to in Îethka (Stoney) Nakoda

as Chaba Imne (Beaver Lake). She'd searched unsuccessfully for it the previous summer, but at the end of that season, a chance meeting with one Sampson Beaver, of the Goodstoney First Nation, provided a breakthrough. Upon learning that Sampson had visited Chaba Imne in his youth, Mary asked him to draw her a map to what is now called Maligne. (Unfortunately, despite her appreciation for Indigenous culture, it seems she could not surmount her colonial bias and declined to compensate him for the map, citing the gifts she had already brought to his family.)

Mary was from an upper-middle-class American family. Born to Quaker parents in West Chester, Pennsylvania, in 1861, she had been raised with a belief in the equality of all people. Her father, a well-known amateur geologist and archeologist, encouraged her, like many in the Victorian-era privileged class, to pursue the study of natural history.

Mary first fell in love with the Canadian Rockies on trips with her husband Charles Schäffer, a physician and amateur botanist. Each summer, they travelled to the Rockies, where Charles studied botanical specimens, and Mary captured them in photographs and watercolours. Though her early camping experiences had brought her misery, upon hearing the stories of explorers like Walter Wilcox and Samuel Allen, she warmed to the idea of roughing it for the sake of adventure.

> "They like to say 'explorer' of me. No, only a hunter of *peace*."

Charles was 23 years older than Mary. He died in 1903, when she was 42 — the same year her parents died. Charles and Mary had no children; she was untethered and held the rare gift of independence, even if high society might shun her for what came next. She met the tragedy with the resolve to broaden the scope of her husband's Rockies-based botanical work, which required her to venture into the backcountry. To help her master horseback riding and wilderness travel, she hired William "Billy" Warren, a Banff-based guide who had recently arrived from England after fighting in the Boer War. (This decision proved to be pivotal; though he was 20 years younger than her, the two married in 1915.)

Completing her first husband's survey of alpine plants provided a practical, if still outlandish, reason for a well-to-do woman to defy the norms

Meghan J. Ward reads a passage from *Old Indian Trails* as she and Jane Marshall stand at Maligne Pass.

JASPER
JASPER NATIONAL PARK
CREE / NĒHIYAWĒWIN
MICHIF
ÎETHKA (STONEY) NAKODA
KTUNAXA
SECWEPEMCTSÍN
93
Maligne Lake
Maligne River
Mount Unwin
Expedition route
N
0
5 km

MAP: CHRIS BRACKLEY/CAN GEO. SHUTTLE RADAR TOPOGRAPHY MISSION (SRTM) 30M DATA: UNITED STATES GEOLOGICAL SURVEY, JAPAN AEROSPACE EXPLORATION AGENCY (JAXA) 30M DATA. LANDSAT 8 IMAGE: NASA, 2024; LANGUAGE LABELS: FIRST PEOPLES' MAP OF B.C.; PARKS CANADA

ARCHIVES AND LIBRARY, WHYTE MUSEUM OF THE CANADIAN ROCKIES. CLOCKWISE FROM TOP LEFT: MOORE FAMILY FONDS. V439/PS-1; MOORE FAMILY FONDS. V439/PS-6; MARY SCHAFFER FONDS. V527/PS 1-203; MARY SCHAFFER FONDS. V527/PS 1-196; MARY SCHAFFER FONDS. V527/PS 1-151; MOORE FAMILY FONDS. V439/PS-12

OPPOSITE, **CLOCKWISE FROM TOP LEFT:** (left to right) Members of the 1908 expedition, Mollie Adams, Mary Schäffer Warren, Billy Warren and Joe Barker, in camp; Mary and Billy navigating the trail; Mary's photo of MacCalla's primula; a group of riders on the trail; Mary with a horse; a view of Mount Murchison. ABOVE: Ward and Marshall stand in Mary Schäffer Warren's footsteps at Maligne Pass.

of the day and ride into the wild. But, in truth, it was her wounded heart that drew her there. In her 1911 book, *Old Indian* [sic] *Trails of the Canadian Rockies*, she alludes to nature having "healers for every ill." But in a 1928 letter to an acquaintance, Raymond Zillmer, she reveals something far more personal: "No one may know I went among those hills with a broken heart and only on the high places could I learn that I and mine were very close together. ... They like to say 'explorer' of me. No, only a hunter of peace."

With Billy Warren as her guide, Mary continued to make the long journey from West Chester to Banff every summer to explore new parts of the Rockies and mend her heart. She eventually published a book with a botanist, Stewardson Brown, called *Alpine Flora of the Canadian Rocky Mountains*. Though the botanical work was complete, her appetite for adventure had grown. She could not sit idly by watching men explore the places she longed to see.

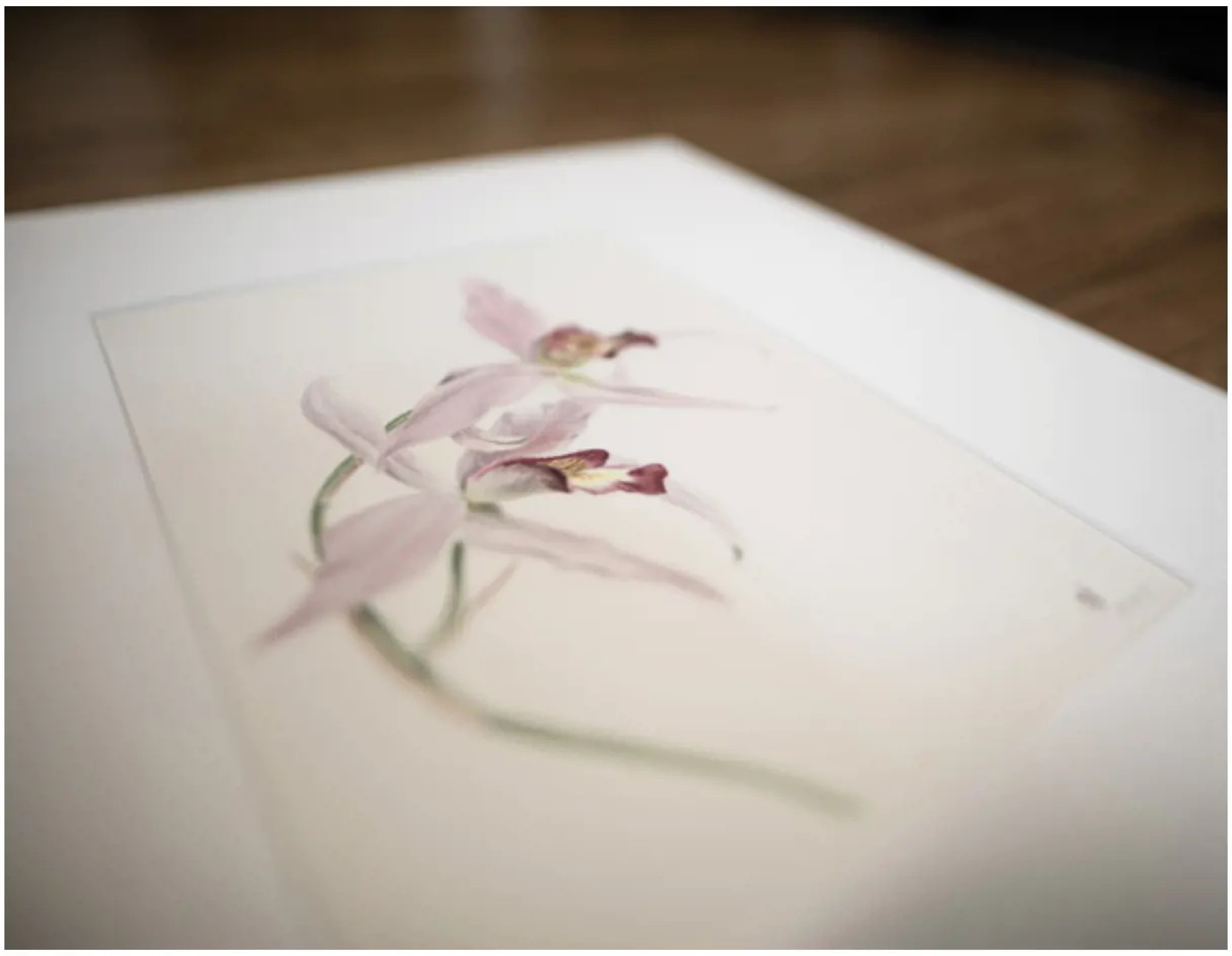
Chaba Imne teased her sense of adventure. The lake provided her with a destination for her ambitious, multi-month expeditions of 1907 and 1908 and stifled the criticism of those who couldn't understand why a woman might delve into a wilderness known only to Indigenous people.

She met the challenges of the trail with apparently cheerful resolve, writing in *Old Indian Trails*, "We have passed weeks of showery or snowy days in the hills, never knew ourselves to catch cold, and on taking everything into account could only conclude that nature meant us all to be wildflowers instead of house plants."

I FIRST ENCOUNTERED Mary in 2005 when I left the hills and hardwood forests of Ottawa for a job at a mountain lodge in Banff. I was 21 years old and feeling invigorated by my first experiences in the alpine when I picked up a book in the lodge's gift shop called *No Ordinary Woman: The Story of Mary Schäffer Warren*, by Janice Sanford Beck. It was spellbinding.

Over the next 17 years, I built a career as an outdoor writer and put down roots in Banff. Time and again, I found myself drawn to Mary's story, frequently weaving it into my work. I found inspiration in how much she surmounted to accomplish what she did in unfriendly terrain — both in the roughness of the backcountry and in a society that spurned a woman who dared to explore it. I'd left suburbia for the mountain life, plunged head-first

Clockwise from OPPOSITE: Ward and Marshall pause among the willows in the Maligne River valley; an original watercolour of *Calypso bulbosa* by Mary Schäffer Warren, ca. 1891; an early morning at Mary Vaux Campground in the Maligne River valley.



into a freelance career and married an adventure photographer. Thanks to her trailblazing, women like me weren't looked down on for pursuing the unconventional.

Then, 10 years ago, I moved into a house across the street from Tarry-a-while — the Banff home Billy Warren built for his wife — where I lived for three years. During Doors Open Banff, when historic homes were opened to the public, I walked across Grizzly Street to take a peek inside. Her living room fireplace still looked exactly as it did in archival images. As it turned out, Mary's desk faced my own writing nook across the street.

Our interweaving stories culminated in 2020 when a friend, Trixie Pacis, an emerging filmmaker from Kimberley, B.C., who was also intrigued by Mary's story, shared with me her idea to make a documentary. I agreed that a film could bring her story to a wider audience. The seed of the idea grew, and in time my role in the film snowballed from researcher to producer to on-camera protagonist.

The film we envisioned would combine two of my greatest loves: archival research and backcountry adventure. The connective tissue would be a series of repeat photographs taken during a retracing of the final leg of Mary's journey to Maligne Lake. This 45-kilometre hike would take us from Poboktan Creek to the mouth of the Maligne River, where we would swap boots for paddles and continue our journey by canoe.

From its inception, we called the film *Wildflowers*. It was a nod to Mary's quote, but soon enough, the beauty and resilience of wildflowers would take on new meaning through the women in the film.

IN THE SUMMER OF 1908, with Sampson Beaver's map in hand, Mary set off once more to find Chaba Imne. Her crew included Billy Warren, cook and wrangler Sidney Unwin, Stewardson Brown and his guide Reggie Holmes. Rounding out the group was an American friend, Mary "Mollie" Adams.

In addition to sharing Mary's interest in botany and photography, Mollie was willing to go the distance, no matter the discomforts. Born in 1868 in Ridgefield, Connecticut, Mollie was a passionate geologist, experienced outdoorswoman and world traveller. She was unmarried, financially independent and had little interest in the activities and trappings of urban high society.

It's difficult to understand the exact nature of the friendship between the two women. *Old Indian Trails* is a travel book meant for entertainment in which it's possible Mary embellished and fictionalized some aspects, including the ease of her relationship with Mollie. Mollie's expedition diaries and letters paint a different picture, suggesting that, like any friendship, the pair had their squabbles and personality clashes. Nonetheless, it's clear they had a rare compatibility and could withstand weeks of rigorous travel together.

For the eight-week expedition of 1908, they had 22 horses hauling

Ward (ABOVE) takes a moment to reflect on the journey. The team hikes along the southeast end of Maligne Pass (OPPOSITE).

all manner of supplies, including a stove for baking bread, photographic plates, geological equipment and air mattresses. The luxury of four-legged porters wouldn't ease every difficulty, however. In *Old Indian Trails*, Mary describes swarms of mosquitoes, treacherous river crossings, cold nights and long days on the trail — made longer when her chronic nerve pain flared up.

Mary and Mollie became the first recorded non-Indigenous women to visit Maligne Lake and many areas of present-day Banff and Jasper national parks. The 1908 expedition would be Mollie's last great mountain adventure. On January 23, 1909, at 41, she died of pneumonia while travelling in Japan with Mary. She is buried in Kobe.

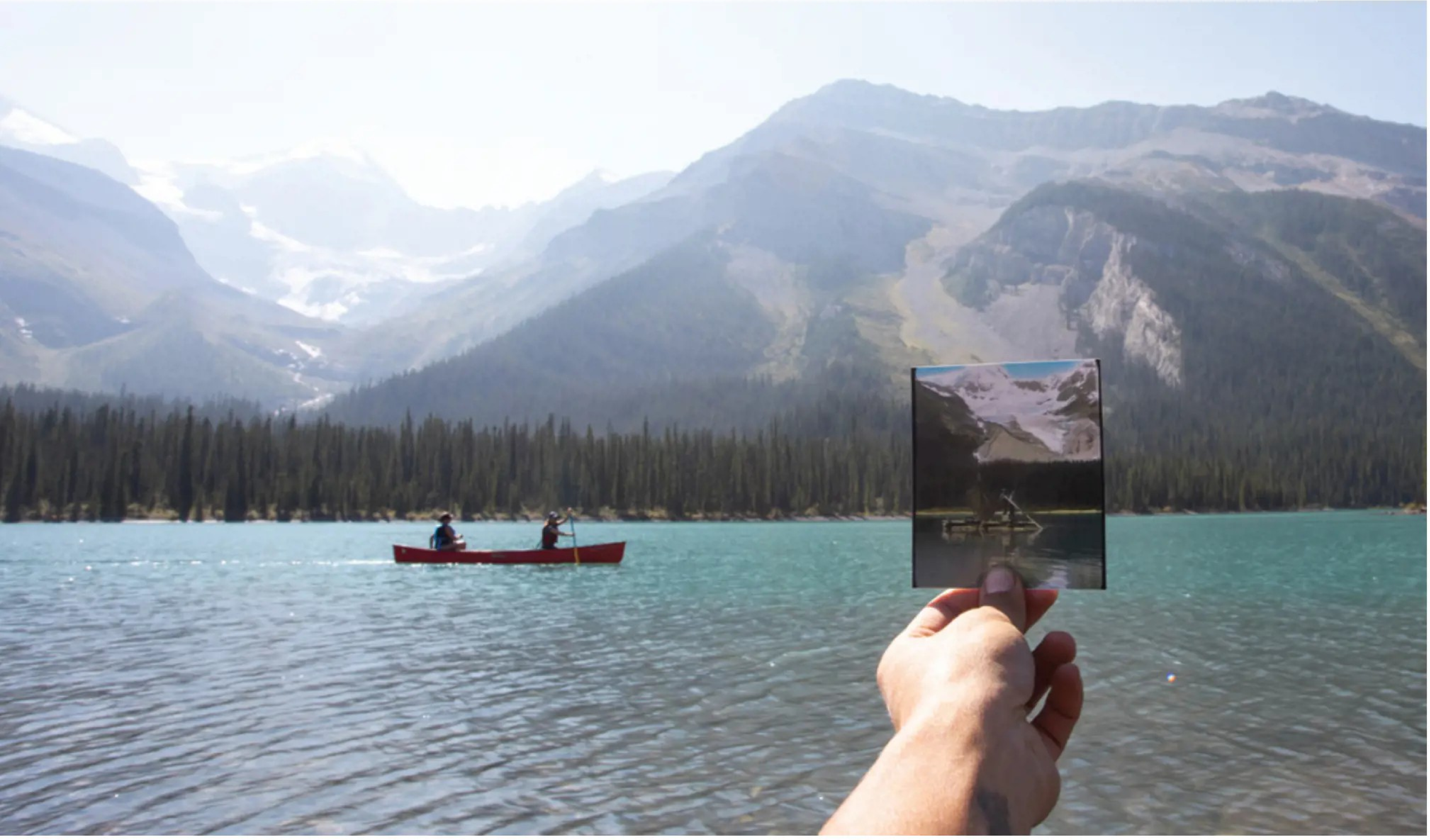
Mary's 1911 book is thus dedicated to her friend: "Who with me followed the 'Old Indian Trails,' but who has now gone on the long trail alone."

OUR 2023 JOURNEY may have differed in style from Mary's, but not in spirit. In addition to Anandi, our expedition cinematographer, Trixie and I had effectively recruited two Mollies: Jane, a fellow writer, outdoorswoman and a grounding presence on the trail, and Natalie, a former wilderness guide turned commercial pilot, as well as a published poet and photographer. It wasn't hard to sell the opportunity; both Jane and Natalie had a thirst for adventure and appreciated what we were aspiring to do with Mary's story.

As we prepared our gear at the Poboktan Creek trailhead, the skies wept with rain, and I found myself overcome with emotion. The historian and outdoor enthusiast in me — the one who had tracked Mary's story for nearly two decades — cherished the opportunity to retrace her footsteps.

Within moments of leaving the trailhead, I feel the world fall away. Two years of logistics and planning materialize with our first steps, and my mind relaxes despite the unknowns that lie ahead. Conversations with my hiking mates ebb and flow, at times constricted by the narrowness of the trail. We slide easily into banter or an exchange of questions between takes for the film, and the group gradually gets to know one another. Peak wildflower season is well over, so when we come upon a magenta-hued paintbrush, we stop to marvel at it, noting its happy, solitary presence in the wet forest. Natalie lingers to photograph it.

I have a copy of *Old Indian Trails* on my phone and read passages aloud as locations align with Mary's record. It is a way to bring her along for the journey.



A view (ABOVE) of Mount Unwin today, compared to the original taken in 1908. Ward and Marshall (OPPOSITE) paddle on Maligne Lake.

At Maligne Pass: “Reaching the eastern slope, I think I never saw a fairer valley. From our very feet it swept away into an unbroken green carpet as far as the eye could see.” That green carpet is the one we follow through dense forest and shrubby meadows to the banks of the Maligne River.

THE RIVER IS silty and powder blue with glacial run-off as it curves through the valley bottom. I trade reassuring glances with my hiking mates as we prepare to cross. “The water levels look fine,” I say, relieved.

Our concern about the water levels is twofold. We must cross if we are going to connect with our canoes stowed some 11 kilometres downriver and complete our journey. But it’s also here that, for a few hours, we plan to split our group in two.

As the expedition photographer, Natalie has been tasked with recreating six images from Mary’s collection. She had taken images of the Crowfoot and Bow glaciers from the side of the road. The other four require detective work during the expedition, combining my historical knowledge and passages from *Old Indian Trails* with Natalie’s keen eye and creativity. We’ve printed reproductions of the archival images, just small enough to fit inside Natalie’s camera filter case, so she has a physical reference copy. These small prints spark for her the idea of including the historical photo in the modern-day landscape, merging past and present in a single frame.

What I don’t know, as we haul our canoes out of the lake, is just how sweet our memories of Maligne will be.

The fifth image had originally been taken by Sidney Unwin from a high point on what is now called Mount Unwin, where he first spotted Maligne Lake. We were determined to have Natalie recreate the original photograph — if we could do it safely. Using reference photographs, Google Earth and GPS, I had pinpointed the location where Sidney captured the image. His route had been a meandering one, with unnecessary altitude gained and lost to get there. But in my research, I had found a more direct route — one that departed just before the Maligne River crossing and climbed a forested shoulder of Mount Unwin to the treeless ridge.

I drop my pack on the riverbank and join the others in gazing up at the ridge to assess the route. It looks steep, but we can see a weakness where one might gain it. This confirms an approach we had discussed the night before: the best way to obtain the image is to send Natalie and Anandi with only the essentials so they can move swiftly and safely. Trixie has paddled in and is waiting for us at the

next campground, so Jane and I load the food and toiletries into our packs and continue onward to meet her.

Pants rolled up to my knees, I set my sights on the opposing riverbank and sling my hiking boots around my shoulders. Then, facing upstream, I wade into the ice-cold water. I keep my pace slow, gingerly sliding my sandalled feet over rounded rocks on the river bottom until I find a good purchase for each step. Jane follows behind.

Safe on the other side, we bid Natalie and Anandi farewell, sending air hugs across the shimmering river. I watch as they move through the willows, Natalie's long black ponytail swinging as she steps off the trail and into the forest beyond. Soon, they are out of sight.

Later that day, we reunite at Trapper Campground, indulge in the fruit, chocolate and cheese that came with the canoes, and swap stories from our time spent apart. Natalie and Anandi's quest to repeat Sidney's image has been a success. The next day, we paddle on Maligne Lake, where Mary and her crew had floated on a raft they dubbed the HMS *Chaba*. From the back of my canoe, I gaze in awe at the turquoise blue stretching towards glaciated peaks. Jane and I align our canoe in front of Mount Unwin so that Natalie can create our last repeat image.

On our final morning, we bask in the first light of day and witness a quiet world coming to life. I am not ready to leave when we reach the docks that mark the end of our journey. What I don't know, as we haul our canoes out of the lake, is just how sweet our memories of Maligne will be — that there will soon come a day when Natalie will have gone "on the long trail alone" and I'll understand the grief Mary carried into the wild.

Based in Banff, Alta., Meghan J. Ward (@meghanjward) is an outdoor writer and historian, a Fellow of the Royal Canadian Geographical Society and author of the travel memoir Lights to Guide Me Home. *Natalie Rose Gillis (1990-2024) was a commercial pilot, Fellow of the RCGS, photographer and author of* This Is Where Atlantis Sank, *a collection of poems.*

Canal Cruises
Trent-Severn Waterway and Rideau Canal

Cruise Ontario's magnificent heritage canals along 568 km of scenic lakes, rivers and locks aboard the **Kawartha Voyageur** riverboat. Twin lower berth with private facilities. **5 DAY VOYAGES**

Free Brochure **1-800-561-5767**
www.cruiseontario.ca
Ontario Waterway Cruises
Box 6, Orillia ON L3V 6H9
Would your friends like to come?

Left to right: Eva Anandi Brownstein, Jane Marshall, Meghan J. Ward, Trixie Pacis, and Natalie Gillis at the Whyte Museum Archives.

WHEN THE NEWS came on June 17, 2024, that Natalie Gillis had died in a plane crash just outside Albany, New York, it sent a shockwave through the nation. She had recently completed the flying hours and exams required for her airline transportation pilot's licence. She had plans to do another master's degree and publish more poetry. When she wasn't flying, she was bikepacking across Canada; she seemed so full of life and ambition. She was just 34 years old.

Wildflowers was in its final weeks in the editing room when I picked up the phone to break the news to Trixie. Suddenly, everything we had been working towards was steeped in new meaning.

I was no stranger to loss, but there was something different for me about Natalie's death and the realizations that came after. Perhaps the intensity of our backcountry experiences had fostered a deep connection, as with Mary and Mollie. Even though I'd known her for many years, the Maligne expedition had been my first multi-day trip with Natalie. A few weeks later, she and I had climbed through glowing larch trees to the crest of a ridge overlooking the Bow Valley. We talked all day — about flying, writing and what it means to live a life of purpose.

Suddenly, everything we had been working towards was steeped in new *meaning*.

For several weeks after her passing, I felt myself flailing while, on a practical level, I did what I could to help our film reach the finish line. All that time at the computer left me longing for time outdoors, where perhaps I could find my breath again. Like Mary, I was feeling drawn to nature to still my spirit. But I also knew it was there I could connect with Natalie. On a solo hike up Saddle Peak, two months after her death, I made a point of stopping to look at the little things that would have caught her eye: red-capped mushrooms, lime-green lichen, weathered wildflowers. I understood, then, what it meant to be a hunter of peace.

Mary passed away in 1939 at the age of 77, having found her peace and blazed the trail for women who would come after her. Though her life was short, Natalie similarly broke barriers and enriched the world through her poetry, photography and indomitable spirit.

These two have taught me that someone's impact can transcend their lifetime, flowing onward like the mighty Maligne, at once a connection to the past and future.

Leading such a life takes courage. Mary's words are as relevant today as they were over a century ago: "No, believe me, there are some secrets you will never learn, there are some joys you will never feel, there are heart thrills you can never experience until … you leave the world, your recognized world, and plunge into the vast unknown." ❖

Catch a screening of *Wildflowers* and learn more at wildflowersfilm.ca

DESIGNATED
TRAVEL PARTNER

Eagle-Eye Tours

EXCEPTIONAL BIRDING & WILDLIFE TOURS

Explore our tour schedule online
www.eagle-eye.com/CanGeo
or call 1-800-373-5678

CANADIAN Geographic
ADVENTURES

The Magic in the Mud

AN INVISIBLE FUEL DRAWS THOUSANDS OF TINY MIGRATING SHOREBIRDS TO THE ROBERTS BANK MUDFLATS EACH YEAR. NOW, WE'RE IN DANGER OF LOSING IT FOREVER.

STORY AND PHOTOGRAPHY BY **ISABELLE GROC**

Western sandpipers (PREVIOUS and ABOVE) at Roberts Bank near the Port of Vancouver.

IT'S SUNRISE IN MID-APRIL on the edge of the mudflats. Armed with a spotting scope, an intensely focused man is scanning, counting. He visits the same place almost every day at this time of the year, guided by tide tables.

To most, the intertidal mudflats of Roberts Bank look like a vast, flat, barren expanse of mud. About 35 kilometres south of downtown Vancouver, the raw, rarely visited landscape would feel almost completely isolated, if not for the rail yards and the Port of Vancouver bordering the mudflats on the horizon.

But to biologist Scott Flemming, it's more than just mud. Every spring, the mire freshly exposed by the retreating tide comes alive with a multitude of tiny, hungry visitors making high-pitched calls that mix with the sounds of the industrial activity and the wind: sandpipers.

"When I come out here, my goal is to survey the flocks that are using the whole mudflat. But I will zoom in every now and then on one specific bird and just watch that individual and think that this bird is now going to fly up to the Arctic and find a nest site," says Flemming, who works with the Canadian Wildlife Service of Environment and Climate Change Canada.

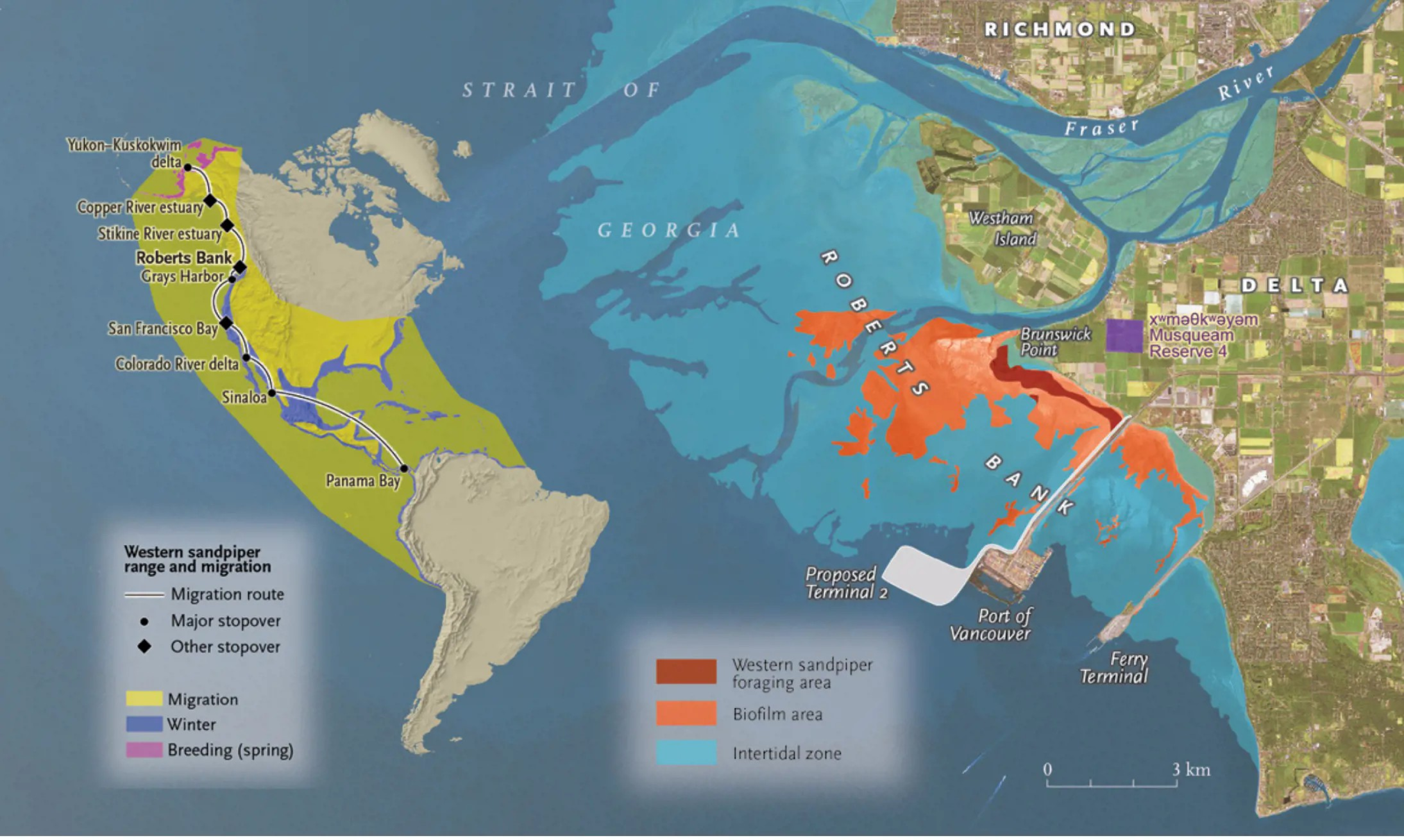
Western sandpipers migrate thousands of kilometres north along the Pacific coast from their overwintering areas as far south as Peru to their breeding grounds in Alaska. These shorebirds, weighing no more than 35 grams, stop at just a handful of places along the North American Pacific Flyway to refuel. Roberts Bank is one of these stopover sites, on the Fraser River estuary in British Columbia. A top biodiversity hotspot in Canada, it's globally classified as an Important Bird Area.

But in 2023, the future of the mudflats was thrown into question. Despite years of protest from scientists, conservationists and community groups, the federal government conditionally approved a proposal by the Vancouver Fraser Port Authority to build a second container ship terminal at Roberts Bank, expand the existing road and rail causeway to the Deltaport and Westshore terminals and scoop out a deeper tug boat terminal to handle the additional shipping traffic. The added 2.4 million twenty-foot equivalent units of containers per year will nearly double the port's container capacity. On top of that, construction of the terminal would require filling in 177 hectares of intertidal mudflats at Roberts Bank, and Environment and Climate Change Canada has predicted the expansion will indirectly affect up to 558 hectares of mudflats — a habitat vital for the survival of not only sandpipers but Pacific dunlin, Pacific salmon and southern resident orcas as well.

If the Roberts Bank mudflats are disrupted to the level scientists fear, it's unlikely many of these diminutive shorebirds will fulfil their Arctic destiny. Between 42 and 64 per cent

---

Isabelle Groc (@isabellegroc) is an award-winning writer, photographer and filmmaker. Her work focuses on wildlife conservation, environmental science, marine ecosystems, and the relationships between people and the natural world.


Yukon-Kuskokwim delta
Copper River estuary
Stikine River estuary
Roberts Bank
Grays Harbor
San Francisco Bay
Colorado River delta
Sinaloa
Panama Bay
Western sandpiper range and migration
Migration route
● Major stopover
◆ Other stopover
Migration
Winter
Breeding (spring)
STRAIT OF GEORGIA
RICHMOND
Fraser River
Westham Island
DELTA
ROBERTS BANK
Brunswick Point
xʷməθkʷəyəm Musqueam Reserve 4
Proposed Terminal 2
Port of Vancouver
Ferry Terminal
Western sandpiper foraging area
Biofilm area
Intertidal zone
0
3 km

MAP: CHRIS BRACKLEY/CAN GEO; COPERNICUS SENTINEL IMAGERY: AUG. 2024. WESTERN SANDPIPER RANGE: IUCN RED LIST, 2024. INTERTIDAL ZONES AND BIOFILM AREAS: HAKAI MAGAZINE, 2016; HARRISON ET AL, ENVIRONMENT CANADA,1998; SCHNURR ET AL, FRONTIERS IN MARINE SCIENCE, 2020

of the entire species relies on Roberts Bank to rest and refuel, and it's estimated that almost every western sandpiper will use the site at least once in its lifespan.

A further question lingers: why here? While the sandpipers undoubtedly need a rest stop on their northern odyssey, they have thousands of kilometres of coastline to choose from — and other mudflats, too. Perhaps there is more to this vast, brown wasteland than meets the eye?

AT THE MIGRATION'S PEAK in late April, Flemming counts around 120,000 to 150,000 western sandpipers in a day. "It's quite busy when you're trying to count them. You've got to move fast," says Mark Drever, a research scientist with Environment and Climate Change Canada who is also involved in the surveys. "One day, you come back to do your count, and they are not here anymore. I always wish them well in these long flights and tell them 'Good luck, little buddies.'"

By mid-May, the sandpipers have all left to their next major stopover, the Stikine River estuary in southwest Alaska, more than 850 kilometres away. Roberts Bank is one of the best and last major stopover spots on the Pacific Flyway because, on the way north, there aren't many large estuaries. A study of radio-tagged western sandpipers showed that, on average, it took 7.7 days for the birds to travel 3,250 kilometres between San Francisco Bay — one of their major stopover sites — and the Copper River delta in Alaska, the last stop before the breeding grounds. One bird flew the distance in less than 42 hours, or about 1,850 kilometres per day.

"These **flights** can be likened to a trip to the **moon.**"

For a long time, scientists assumed without debate that the sandpipers stopped at Roberts Bank to refuel on worms and other small marine invertebrates. That changed when, more than 30 years ago, a mud aficionado with an inquisitive streak began to closely observe western sandpipers while they were feeding.

Robert Elner grew up by the sea in England, developed an interest in marine biology as a child and pursued a PhD in crab feeding behaviour. It was their similarity to crabs that first drew him to sandpipers. "It immediately struck me that they looked like crabs scurrying up and down the mudflat," says Elner, now a scientist emeritus with Environment and Climate Change Canada and adjunct professor at Simon Fraser University.

The fact that there were so many birds in what looked like a desolate wasteland intrigued Elner. "How many people go out onto a mudflat for a recreational stroll in the evening? It's smelly, you get stuck, you fall over. It's nothing like walking in a tropical forest or a rocky seashore."

To tackle this enigma, Elner ventured out on the mud. "Learning to walk on mud was almost an acrobatic

---

Reporting for this story was supported by the Sitka Foundation and the Science Media Centre of Canada.

At Roberts Bank, Robert Elner (OPPOSITE, LEFT) reveals the mud layer where sandpipers find biofilm (ABOVE and OPPOSITE, RIGHT).

experience," he recalls, with the lingering excitement of a pioneer that stepped on faraway land.

Even though mudflats are one of Earth's oldest and largest coastal ecosystems, few have studied them, largely because they are difficult to work in. "Mud is almost unknowable. If it was a rocky shore, we could walk out there, pick up mussels and dig clams. But here we have something that is deep and complex," Elner explains. "It's like being an explorer: you are finding life in a wasteland."

Following Elner as he effortlessly navigates the mud with his hip boots feels worthy of an Olympic discipline. The terrain is uneven, unpredictable, deceptive, hard in some spots and soft in others, always challenging. Meanwhile, Elner displays a sense of excitement unabated in the last 30 years. "Here, we are surrounded by 70,000 western sandpipers. You are joining these birds in this intense migration. You are stepping into their universe," he says. "It's powerful. It is a natural drug. That thrill never leaves you."

With a spatula, Elner scrapes the surface and reveals black, sulphur-smelling mud. "It's black because there is no oxygen. There is not much that can live in that."

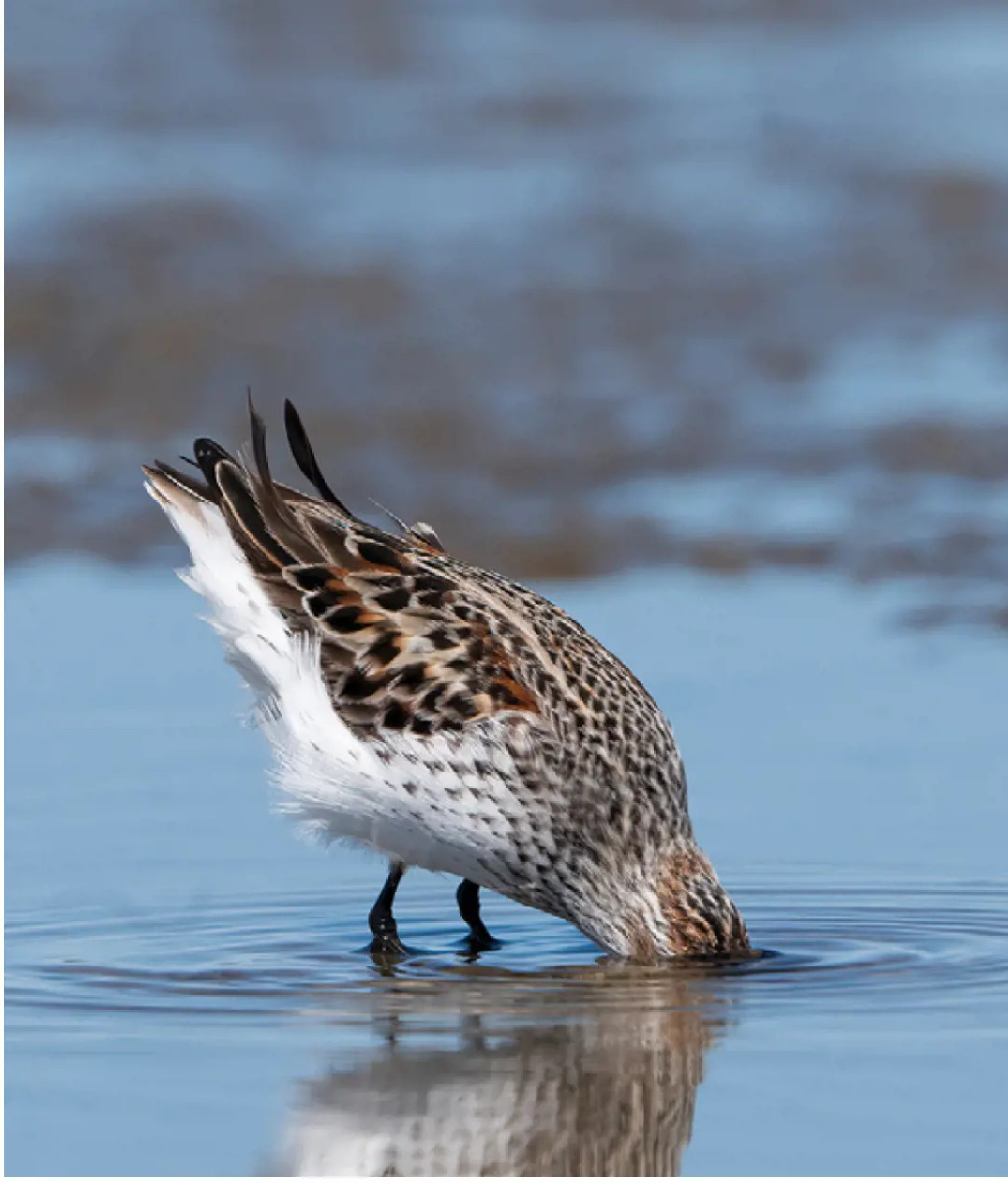
Elner notes the absence of the invertebrates that the sandpipers were reputed to be eating. Yet the birds are constantly pecking at the mud surface. They seem to be voraciously feeding on… nothing?

In the mid-1990s, Elner examined the stomachs of a few dead sandpipers. He found only sand particles and liquid. Curious, he shipped a few frozen sandpiper heads to a colleague in Nantes, France, who had a powerful electron microscope to more closely examine the birds' bills and mouthparts. It turned out that the sandpipers have unusually hairy tongues, and the electron micrographs also revealed microcosmic plants called diatoms on the long, fine bristles of the birds' tongues. "That was the eureka moment," Elner says.

When he realized that their tongues were like specialized toothbrushs, he knew they would offer no real advantage in feeding on invertebrates; instead, the sandpipers were using their tongues to scrape *biofilm* off the surface of the mud. It was biofilm — a thin, sticky layer of microbes, organic matter and sediment bound together by diatom- and bacteria-secreted mucus — that was somehow fuelling the birds on their epic adventures. Until then, the only creatures that were known to eat biofilm were marine invertebrates and fish.

Elner and his colleagues figured out that the sandpipers use the biofilm as a special energy drink to power their extreme migration, just like marathon runners. The birds were not loading up on just any mud slime but specifically targeting biofilm containing a high concentration of omega-3 fatty acids, generated by the diatoms.

Those high-nutrient fatty acids — especially two called eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) — offer many benefits to the birds, boosting their immunity and reducing inflammation. These essential nutrients also tweak the birds' flight muscles, transforming them into endurance muscles that can get them to Alaska with enough energy left over to breed. "It



enables the birds to be better flyers and to be more efficient on their migration," explains Patricia Baird, a seabird ecologist who discovered the unique role of diatoms in the production of omega-3 fatty acids.

Experiments with flying western sandpipers in a wind tunnel showed that birds fed food rich in fatty acids increased their flying efficiency by about 12 per cent. "These flights can be likened to a trip to the moon. You need enough fuel and life support to get there," says Christopher Guglielmo, a biologist who ran the experiments in the wind tunnel at Western University's Advanced Facility for Avian Research. "If you think of shorebirds as little rocket ships, they have to budget everything out along the whole trip to make it successfully."

The sandpipers are so dependent on the biofilm at Roberts Bank that it accounts for 45 to 59 per cent of the mass in their diet and half their daily energy budget. Without it, many birds would not make it to their final destination, as the nutrients cannot be obtained from any other available food. "It's the magic carpet that enables them to fly," says Elner.

Since the first observations of biofilm grazing by western sandpipers, it's been found that biofilm feeds at least 21 other species of shorebirds at estuarine stopover sites. Perhaps more importantly, the story of western sandpipers at Roberts Bank has shed a new light on the ecological value of a largely misunderstood ecosystem.

"Mud is almost **unknowable.**"

COMPARED WITH MORE charismatic habitat types like eelgrass or saltmarsh, western science generally sees intertidal mud as a purposeless wasteland. Globally, mudflat ecosystems decreased 16 per cent in certain areas between 1984 and 2016, largely due to degradation from coastal development, pollution and disturbances from marine traffic.

Meanwhile, a study of 28 shorebird species in North America revealed that between 1980 and 2019, more than half of the surveyed species lost more than half of their populations. Jim Johnson, a biologist who studies migratory shorebird species in Alaska's breeding grounds, says habitat loss is a driving force in shorebird declines. "The most devastating part of these declines is what's happening in the non-breeding areas where these birds are migrating and wintering."

Linking the global loss of critical mudflats and the demise of migrating shorebirds is a logical connection to make, and possibly a sign of wider issues to come. "Birds are great harbingers of what's happening in systems," Elner says. At Roberts Bank, the fatty acids produced in mudflats are also important to invertebrates, salmon and the endangered southern resident orcas that depend on them and, ultimately, human health. "The birds have told us this, and if they had not been there, no one would have figured out that biofilm production is critical."

It's therefore ironic that as scientists are learning about the global importance of mudflats, the site where it all began is now threatened by the port development. Proponents of the project, however, downplay adverse

effects — and point to the huge economic potential of the development. Alex Munro, senior communications advisor, issues management and media relations at the Vancouver Fraser Port Authority, said in a written statement to *Canadian Geographic* that the project will deliver critical capacity and resilience to support Canada's trade needs. He said it will create tens of thousands of supply chain jobs, support an estimated $100 billion in Canadian trade per year, and deliver hundreds of millions of dollars in tax revenues and billions of dollars in Canadian GDP during operation. At a time when Canada's economy is struggling, many see the benefits as enticing — especially when, according to Munro's statement, the project is advancing "in a way that protects the environment," and is "not expected to have adverse effects on biofilm and western sandpipers."

But not everybody agrees. A coalition of environmental groups in British Columbia has filed an application for a judicial review in the Federal Court, challenging the federal government's decision to approve the Roberts Bank Terminal 2 Project and arguing it is contrary to the Species at Risk Act.

And, in a review of the project, Environment and Climate Change Canada found that in addition to the direct loss of mudflats, the impacts on biofilm would be permanent, irreversible and unmitigable, with species-level consequences for western sandpipers. There would also be no way to recreate the rich biofilm habitat.

> "Biofilm is the **magic** carpet that enables them to **FLY.**"

This is because the invisible processes at work in the mudflats of Roberts Bank are influenced by complex physical and chemical interactions. Spring is a time of rapid change over the mudflats, with more sunlight, rising temperatures and lowest tides that occur during daylight hours. Photosynthetic activity increases and diatoms grow rapidly. At the same time, the Fraser River's pulse of fresh water from the snowmelt-fuelled spring freshet changes the salinity of the mud, causing a stress response in the diatoms that stimulate them to produce omega-3 fatty acids, the birds' superfood. The freshwater "shocks the diatoms," Elner says. The magic in this delicate natural cycle is this is all perfectly timed with the arrival of the western sandpipers on their spring migration.

But this magic does not happen everywhere. "Not all mudflats are the same. Some are heavily used by birds and others are not," Drever says.

Drever and his team found that abundances of western sandpipers and dunlin were up to 100 times higher at Brunswick Point on Roberts Bank than at another mudflat at Iona Beach, which is next to the Vancouver International Airport and a sewage treatment plant and has two jetties. Nutrient content in intertidal

A murmuration of western sandpipers (LEFT) swoops over Roberts Bank. A droplet of diatom-rich biofilm hangs from the beak of a sandpiper (RIGHT).

biofilm was also measured to be 1.4 to 3.8 times higher. Artificial structures like the jetties and causeways near Iona were found to disrupt freshwater flow and the availability of biofilm.

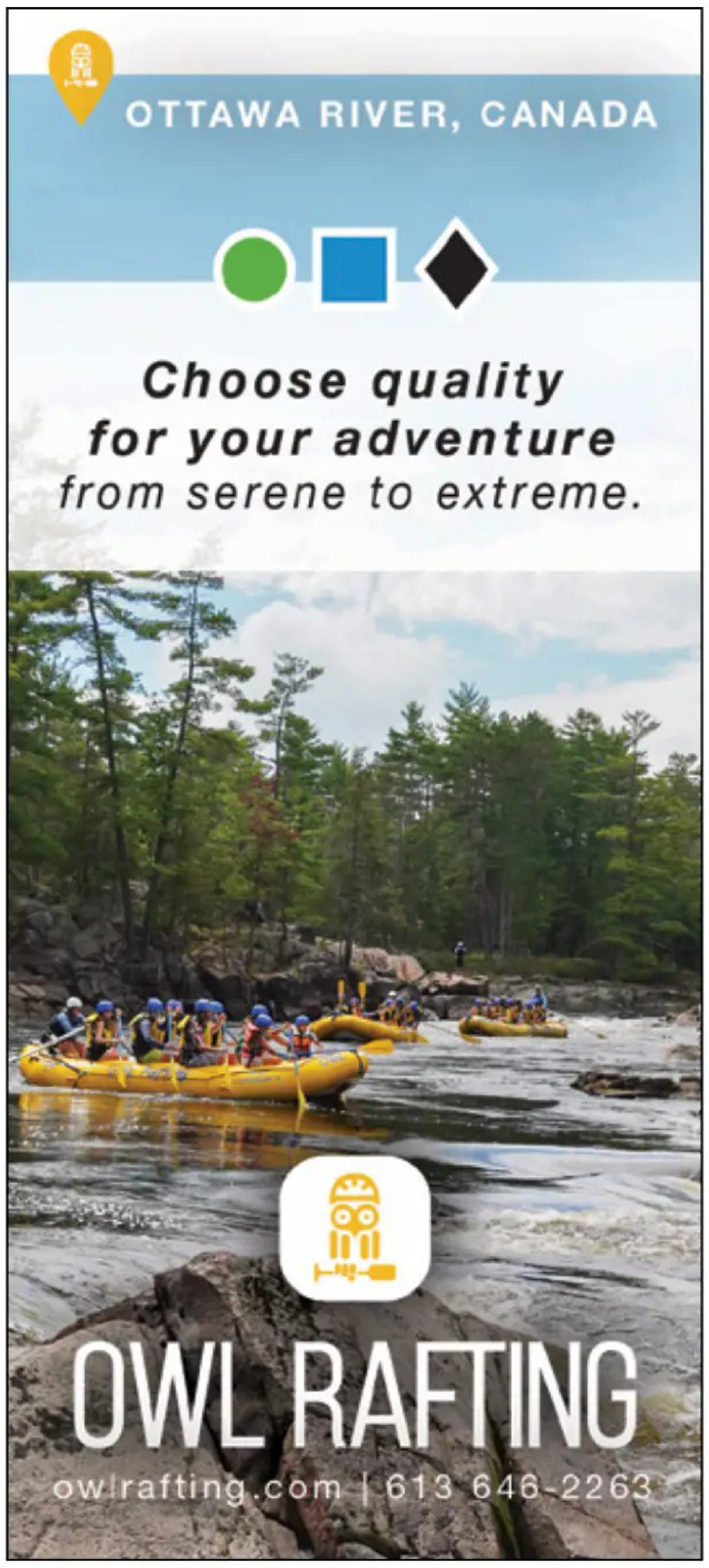
"Those mudflats are still mudflats, but they don't provide the biofilm that the birds need to refuel," Elner says. This makes Roberts Bank the sole remaining large bank in the Fraser River estuary where these natural conditions are still intact.

This explains why the port expansion project is so concerning. It is predicted that the development will restrain the Fraser River's outflow and remove the salinity trigger for high fatty acid production by diatoms. The sandpipers would lose access to the essential nutrients from the biofilm and likely become endangered within 30 years, with cascading effects on the entire ecosystem.

With the loss of Roberts Bank in the chain of migratory stopover sites, the sandpipers would need to fly at least an additional 250 kilometres from the Grays Harbor stopover in Washington state directly to the Stikine River Estuary in Alaska, a distance of about 1,200 kilometres. "It is like taking a rung out of the ladder," Elner says. "Fewer and fewer birds are going to make it."

Like other shorebirds, western sandpipers are already in trouble due to climate change and habitat loss and degradation. The Canadian Wildlife Service's spring shorebird survey conducted by Flemming at Roberts Bank has shown that over the last 30 years, the number of western sandpipers using the stopover site has declined by 54 per cent and counting. "It's telling us how much our environment is changing," Flemming says.

The port expansion is not yet a certainty, though, and the federal government has subjected the project to 370 legally binding conditions to protect the environment, wildlife and land use activities of Coast Salish First Nations.



OTTAWA RIVER, CANADA

● ■ ◆

Choose quality
for your adventure
from serene to extreme.

OWL RAFTING
owlrafting.com | 613 646-2263

Biologist Scott Flemming (ABOVE, RIGHT) helps with a Canadian Wildlife Service survey at Roberts Banks (OPPOSITE) that began in 1991 to monitor trends in bird populations. A sandpiper at the breeding grounds in Nome, Alaska (ABOVE).

Some First Nations governments are against the project while others are provisionally for it. Tsawwassen First Nation, separated from the port by a few short kilometres of mudflats and water, signed a relationship agreement with the Vancouver Fraser Port Authority in 2021. In June 2023, sxwamisaat (Chief Laura Cassidy) said the Nation has provided consent for the project but is not advocating for it.

But for Steven Stark, Tsawwassen First Nation band member and crab fisherman, the Tsawwassen way of life is "just not going to be the same."

"I still have unanswered questions about health concerns, noise pollution, air pollution, light pollution, which are all going to affect the migrating birds that come in and out of the region. Where do they go and where do the crabbers go?"

Among the 370 conditions, the Port of Vancouver is required to monitor the impact of port activities on biofilm over a minimum of three years through the appointment of an independent committee of scientists. If the biofilm is found to be compromised, the federal government will require the port to enact measures that could include the redesign or removal of the infrastructure.

"If you don't
PRESERVE
Roberts Bank, it's gone.
You can't bring it back."

Amid this ongoing David and Goliath drama of microscopic diatoms, tiny shorebirds and a mega-port development, Elner, Baird and colleagues are working to further build the case for protecting the sandpipers' critical food source. "Science has got a very limited time to bring home the answers," Elner says. Their research includes experiments to understand if the shorebirds locate nutritious patches of biofilm on Roberts Bank by smell. For Baird, not enough is known to let the mudflats be developed. "Why risk it?" she says. "If you don't preserve Roberts Bank, it's gone. You can't bring it back."

On the birds' breeding grounds in Alaska, Johnson is collecting sandpiper eggs as part of a study on whether the fatty acids they ingest at stopover mudflats play a role in chick growth. Proving that biofilm is also an essential component of the birds' ability to reproduce will heighten the importance of conserving sites like Roberts Bank, he says.

Meanwhile, Elner continues to visit Roberts Bank every spring, on a constant mission to convert visitors to the magic he finds in the mud. He evokes *The Secret Garden*, Frances Hodgson Burnett's 1911 children's novel in which a young girl discovers a garden locked up in the grounds of her uncle's manor in the Yorkshire countryside. The garden becomes a catalyst for healing the characters in the book. The story resonates with Elner — the mud his secret garden, the sandpipers its fleeting visitors. "It's brilliant, it's productive, and it's beautiful," he says. "Everybody I have taken here, they really start to smile." ❁

Get here
Whistler,
British Columbia
Plan your trip →
VIA Rail Canada

Canadian PHOTOS OF THE YEAR 2024

Canadian Geographic honours the winners of our annual photo competition

Lightning strikes a canola field from a bruised sky. An octopus mother tenderly guards her eggs. Mountain bikes tumble through the summer air. The winners of *Canadian Geographic*'s Canadian Photos of the Year competition — judged by Christian Fleury, Jenny Wong, Scott Forsyth, Ryan Tidman and the magazine's editorial and design teams — bring to vivid life the meaning of the word "photography," which means "drawing with light."

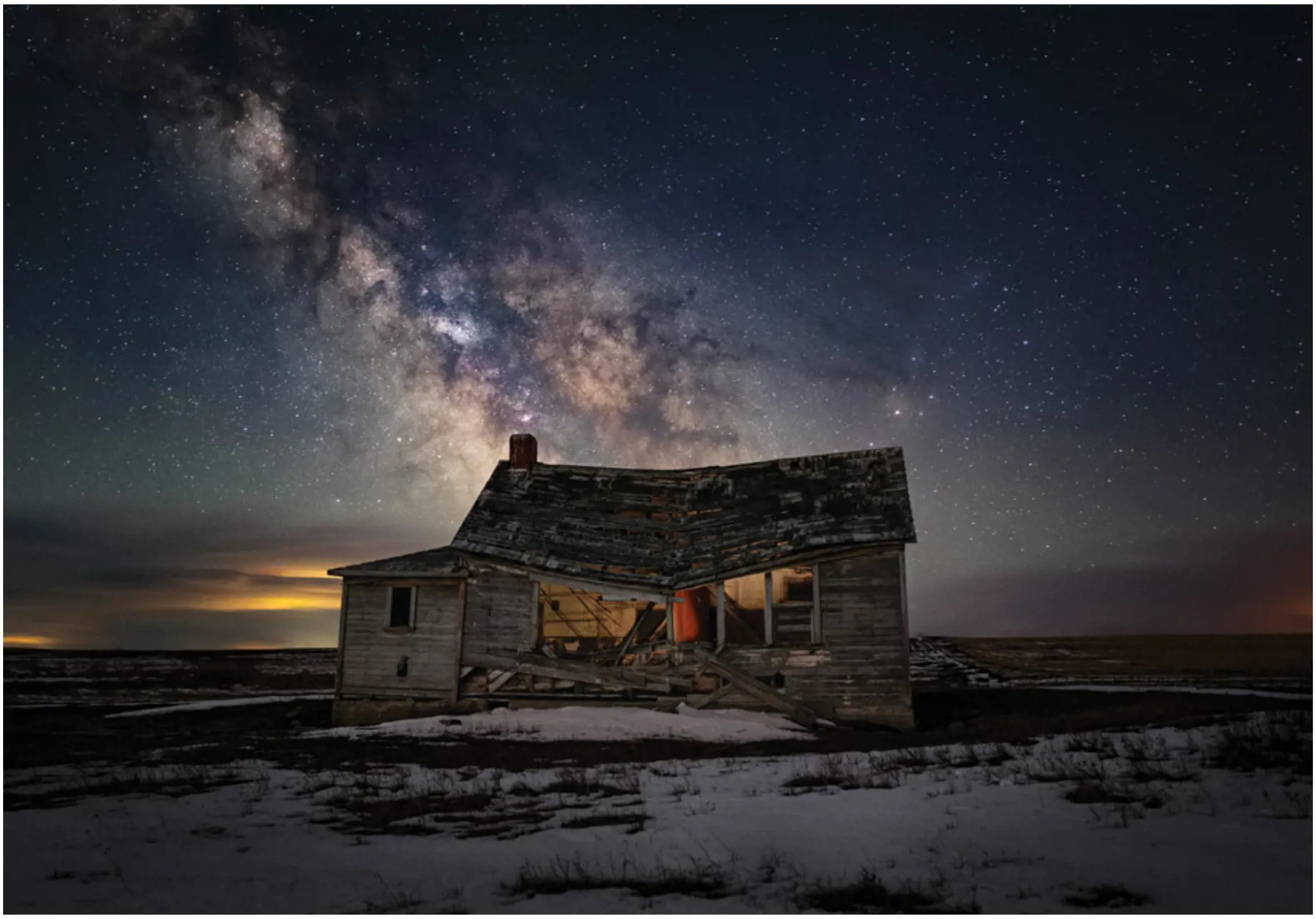
Our Canadian Photographer of the Year is Shane Turgeon, 47, of Edmonton and Pincher Creek, Alta., who has been chasing the light he found in photography since a nervous breakdown in 2012. "It scared the hell out of me, and in the process of that, I discovered photography," says Turgeon. As he walked with his dogs, he started noticing dewdrops on grass, frost on leaves. "All those healing effects of nature really started to take hold."

Growing up "at the end of a dirt road in the middle of nowhere, Saskatchewan," Turgeon had always found solace in the night sky. "It has this profound ability to put everything in perspective, because cosmically we are absolutely insignificant." He started practising astrophotography with those little pinpricks of light, then diversified to pursue all aspects of nature photography. When his dog, Kwinn, got sick in summer 2024, Turgeon looked for inspiration closer to home: backyard bugs, auroras dancing over waterfalls. The day after Kwinn passed, the Tsuchinshan-ATLAS comet appeared in the sky. As he chased the comet, he chased away his grief.

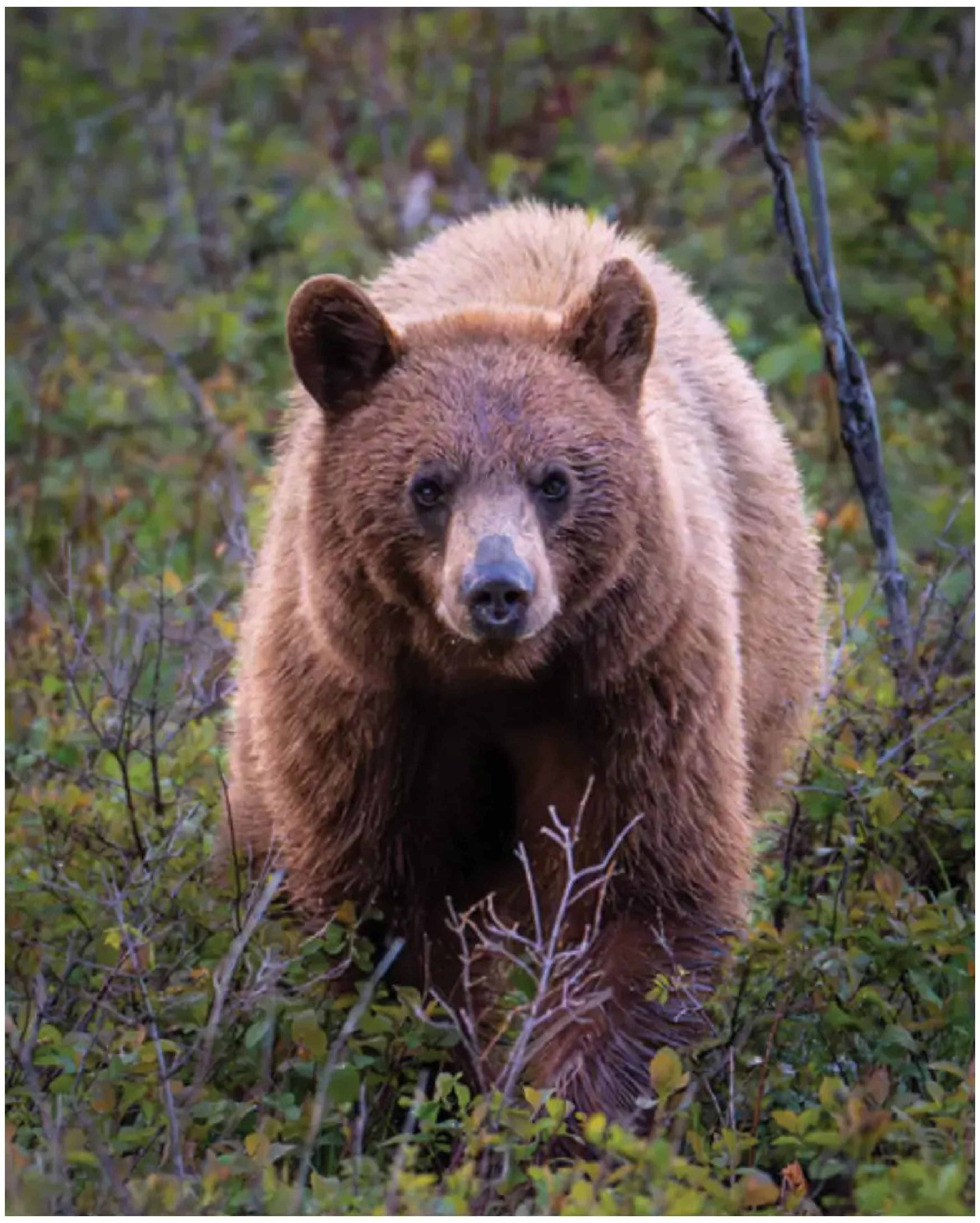
"Photography is this place of light," says Turgeon. "We're constantly chasing the light, figuratively and literally, because, in life or photography, we want that light in our life."

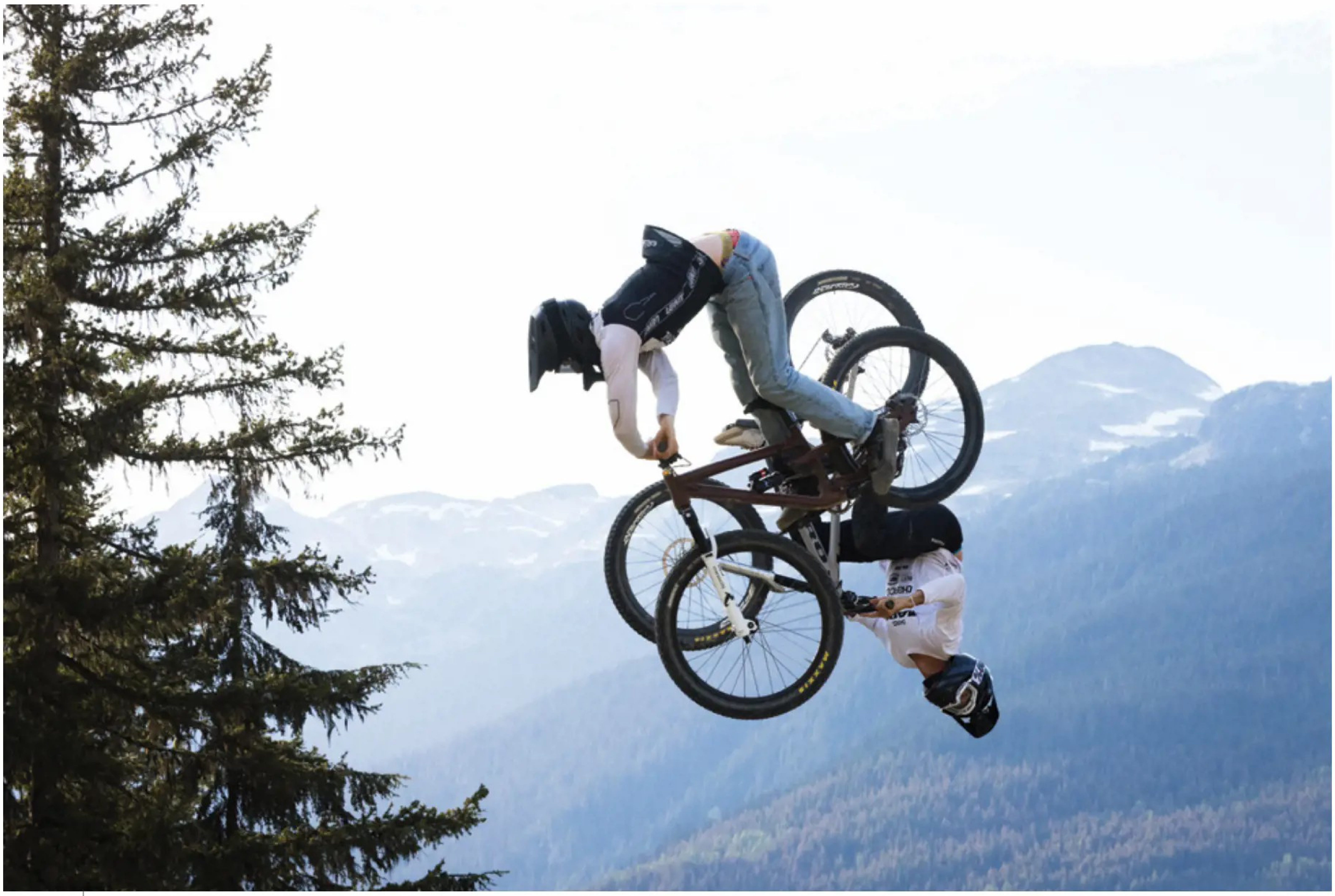
SHANE TURGEON

CANADIAN PHOTOGRAPHER OF THE YEAR 2024



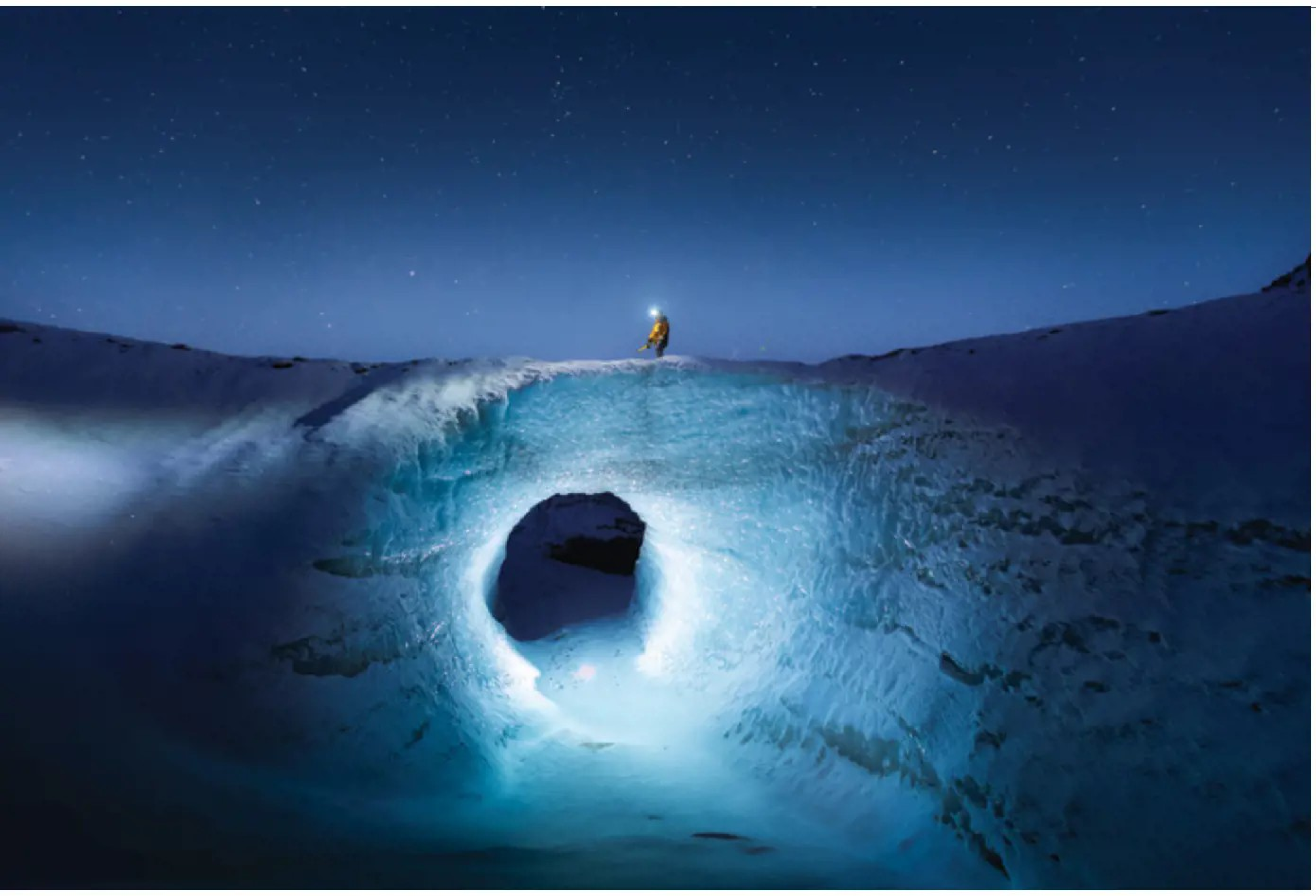
Sunset adds a warm glow to this developing supercell (PREVIOUS PAGE) near Bentley, Alta.; the Milky Way (ABOVE) rises above the abandoned Utopia School, an old one-room schoolhouse that opened in 1904; when the photographer's eyes met the eyes of this grizzly bear in Waterton Lakes National Park, Alta., (RIGHT), it was a profound moment. "You understand that we are all deeply interconnected," reflects Turgeon. "That we are all a part of nature. That we all require a clean environment and have a need for a safe existence."





OUTDOOR ADVENTURE | WINNER

Sara Kempner
These mountain bikers hit their jumps at the same time as they race side-by-side on parallel tracks during the "Speed & Style" competition at the 2024 finale of the Crankworx World Tour, held in Whistler, B.C.



OUTDOOR ADVENTURE | RUNNER-UP

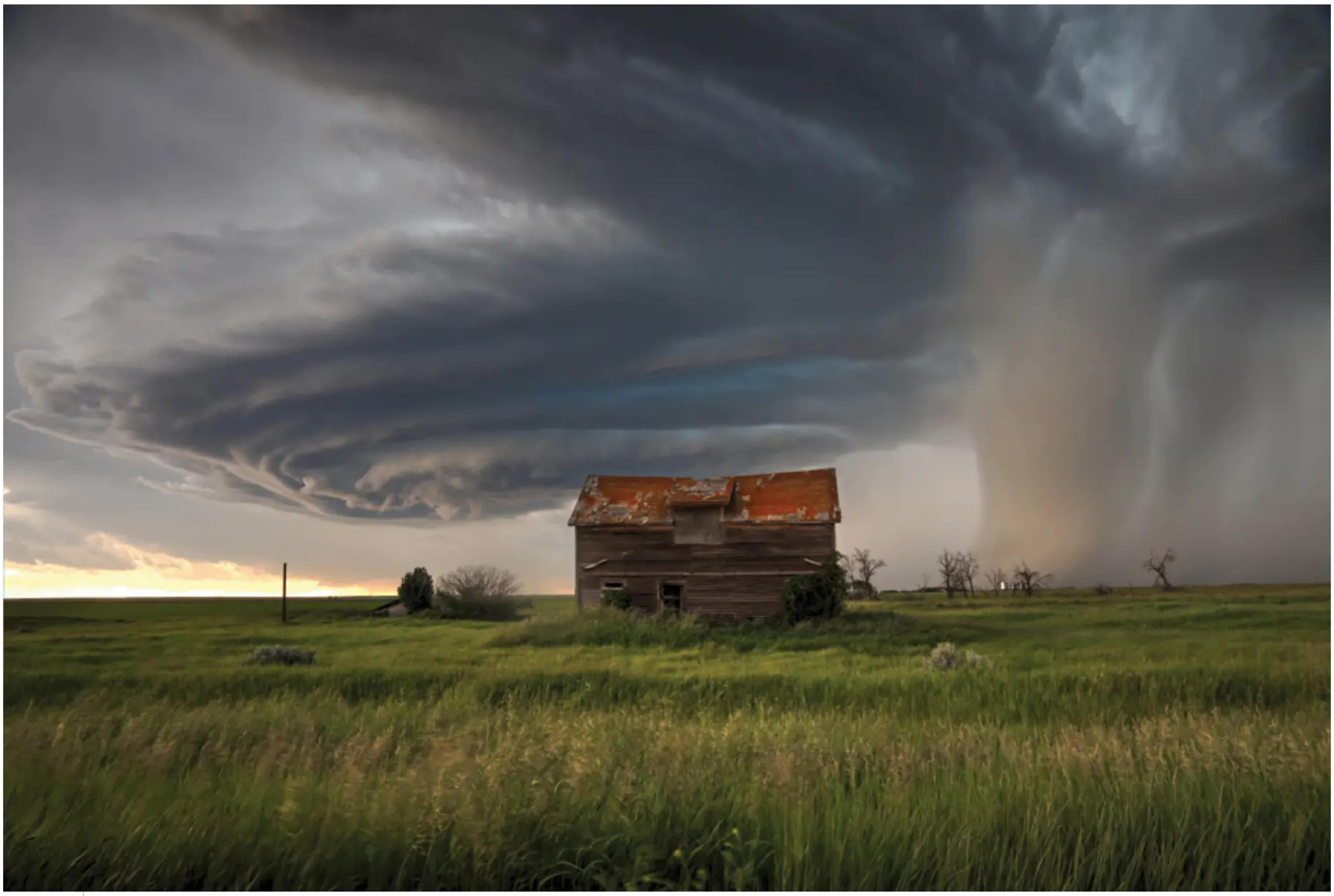
Matthew Littlewood
Dome Glacier, on the Icefields Parkway in Banff National Park, Alta., is constantly shifting, creating new features each year. This icy archway had only been a small opening the previous year and is unlikely to remain intact this year as the glacier shifts.

URBAN AND NATURAL LANDSCAPES | WINNER

Peter Baumgarten
The late afternoon sun paints the sky a moody apricot between the looming silhouettes of two condo towers in Etobicoke, Toronto. From Butterfly Park, the photographer used a super-telephoto lens to focus on the contrast between light and shadow.

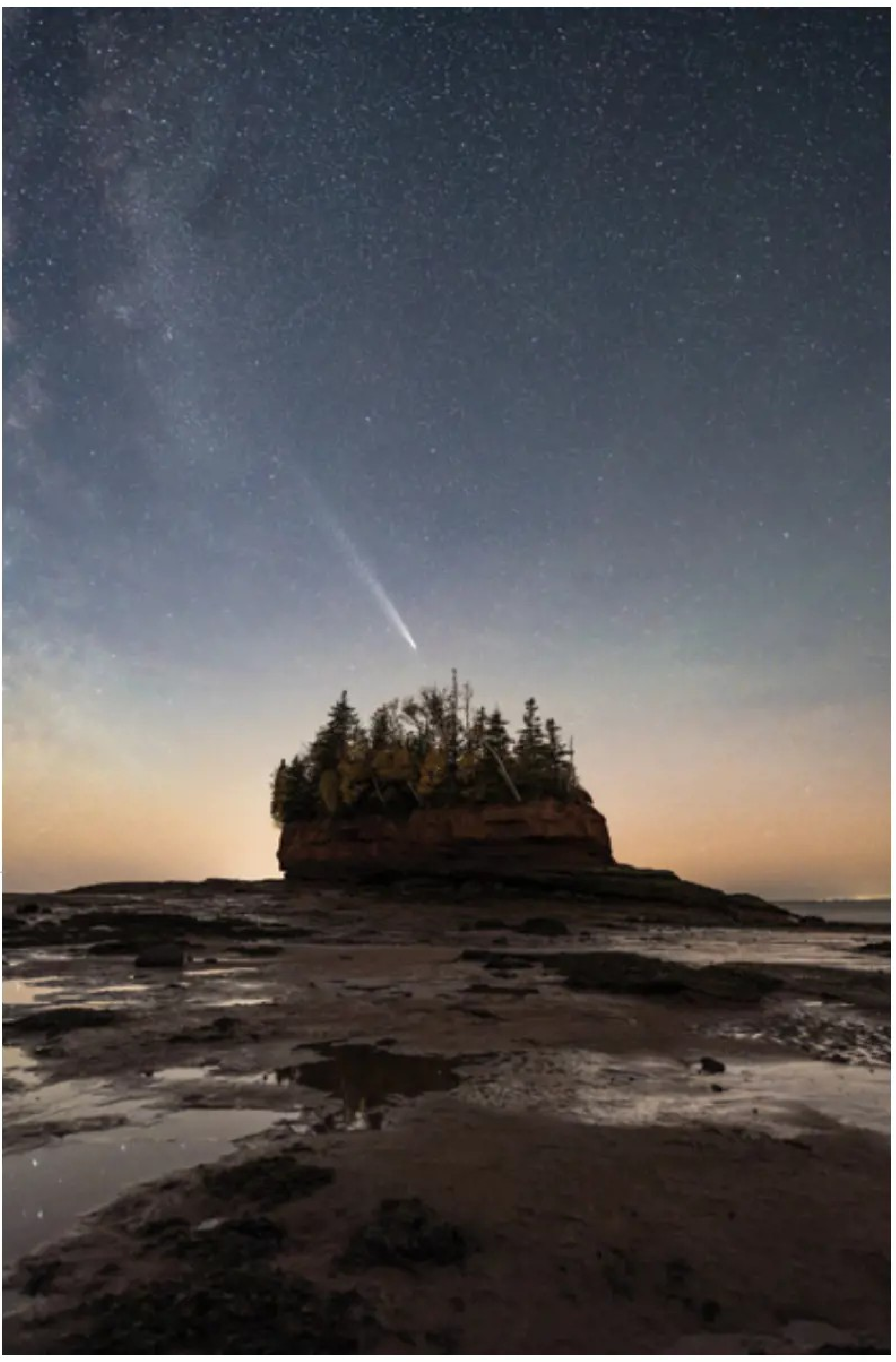
URBAN AND NATURAL LANDSCAPES | RUNNER-UP

Sonny Parker
A storm brews over the Kluane Ranges in Kluane National Park and Reserve, Yukon, as the sun illuminates the Kaskawulsh River valley in gold.



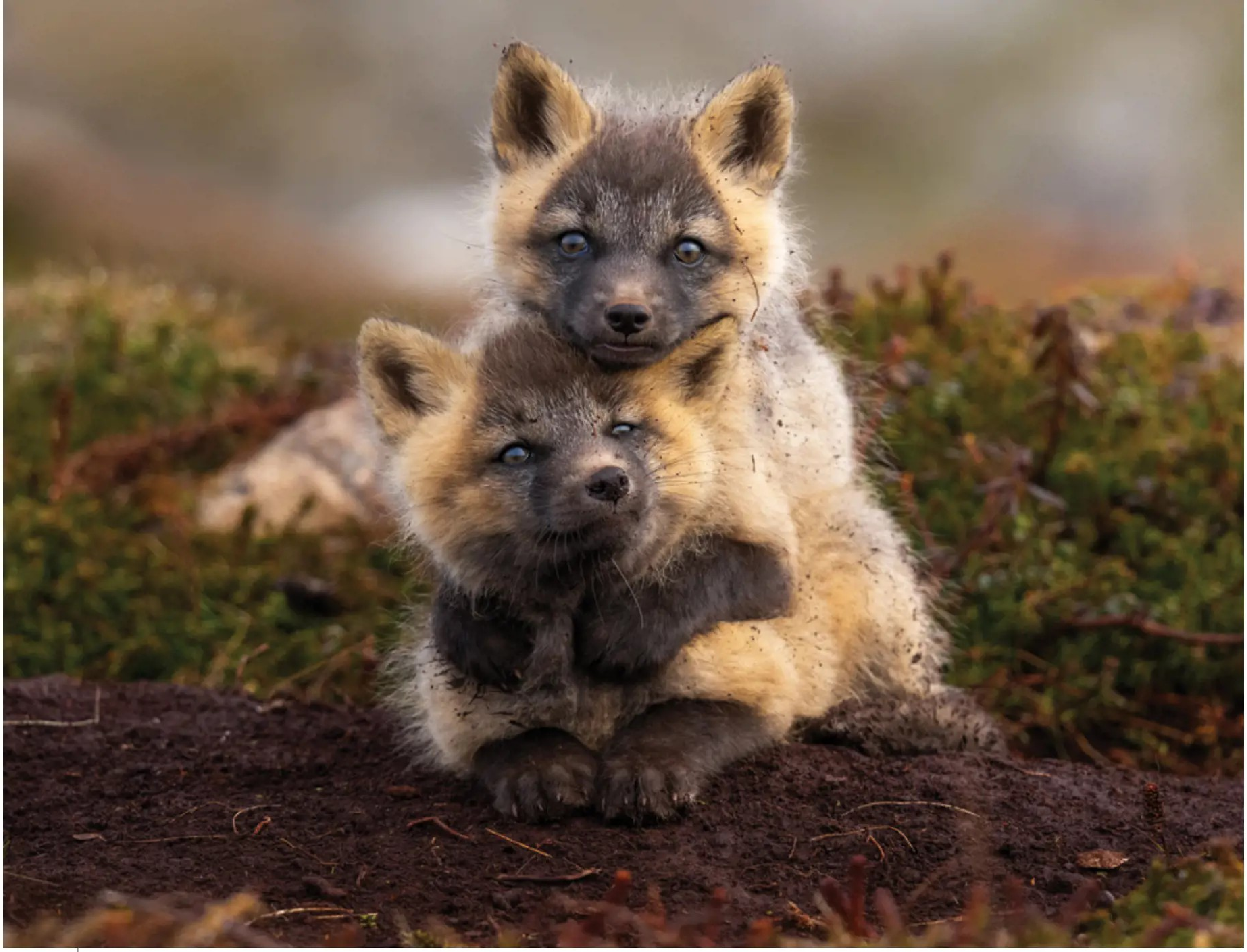
WEATHER, SEASONS AND SKIES | WINNER

Craig Boehm
A tornado-warned storm swirls like a cinnamon bun over the prairies of Avonlea, Sask. The sculpted cloud above the abandoned building is the rain-free updraft area, while a microburst dumps rain and hail on the right-hand side.



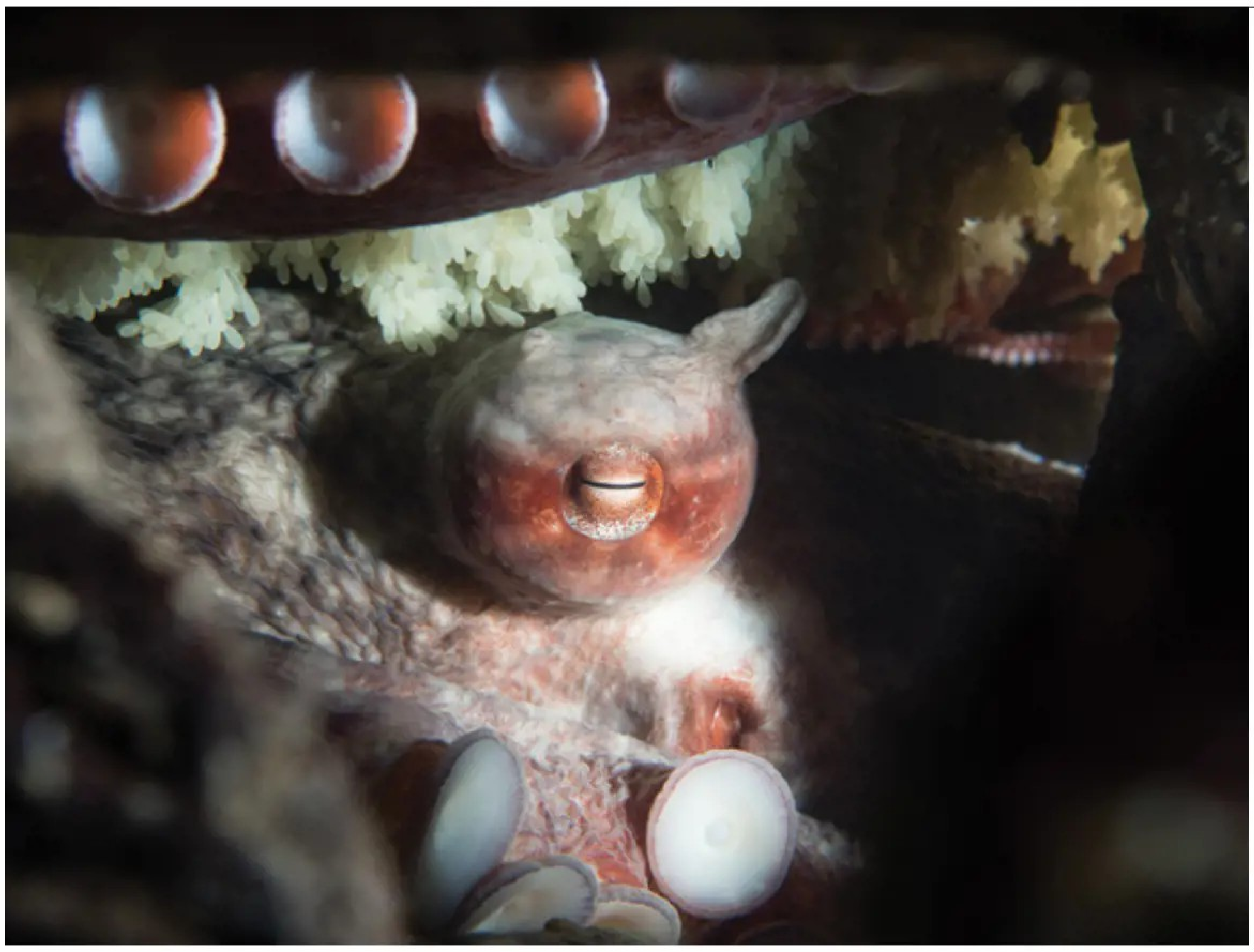
WEATHER, SEASONS AND SKIES | RUNNER-UP

Curtis Watson
The Tsuchinshan-ATLAS comet streaks over the Bay of Fundy at Burntcoat Head Park, N.S., during low tide in October 2024. The last peoples to see this comet, which has an 80,000-year orbit, with the naked eye would have been the Neanderthals.



FLORA, FAUNA AND FUNGI | WINNER

Stuart White
Two red fox kits, tumbling around in the dirt of Bonavista, N.L., pause their play to glance at the photographer in the soft morning light. Fox kits are born in the spring and after nine weeks are old enough to hunt with their parents.

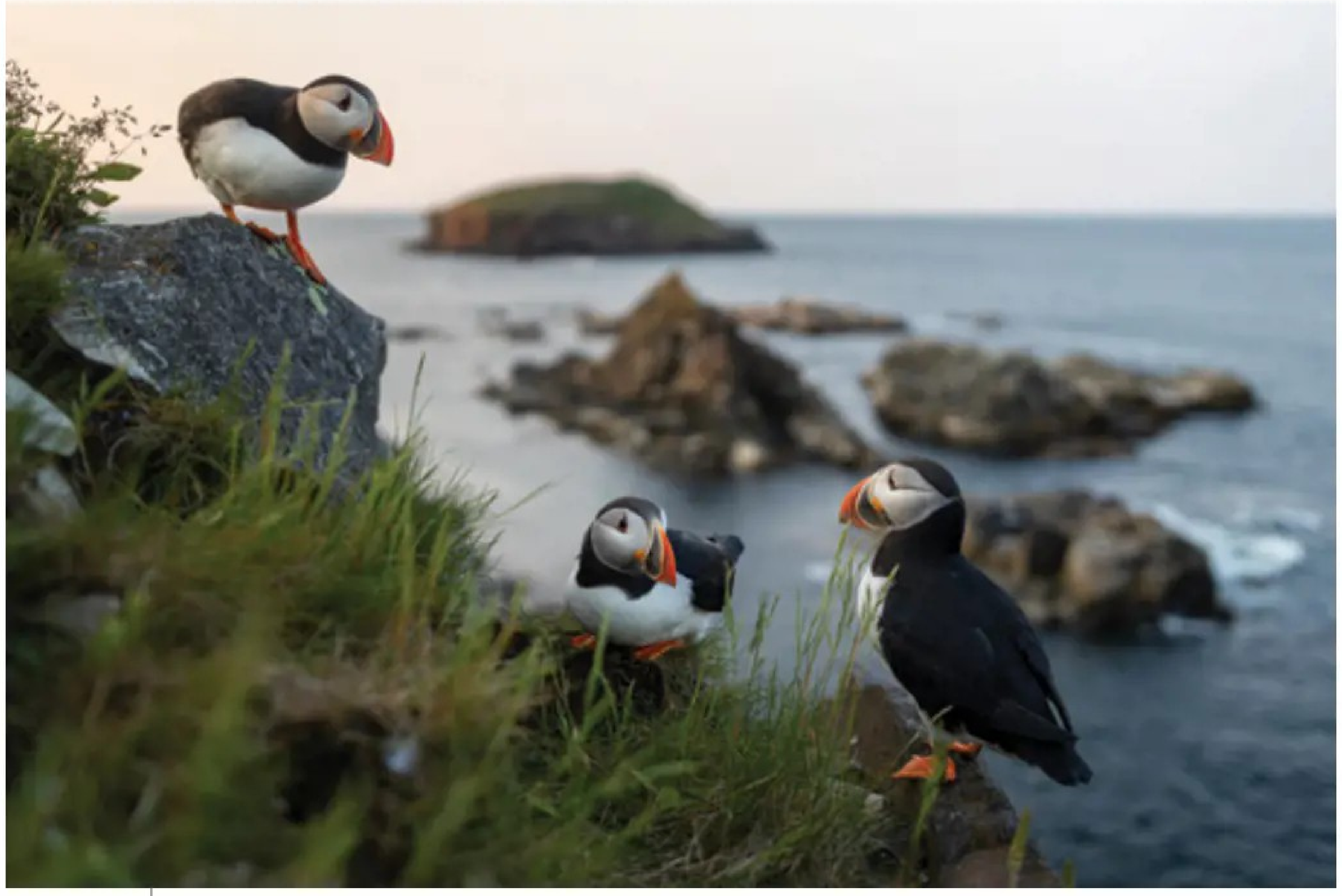


FLORA, FAUNA AND FUNGI | RUNNER-UP

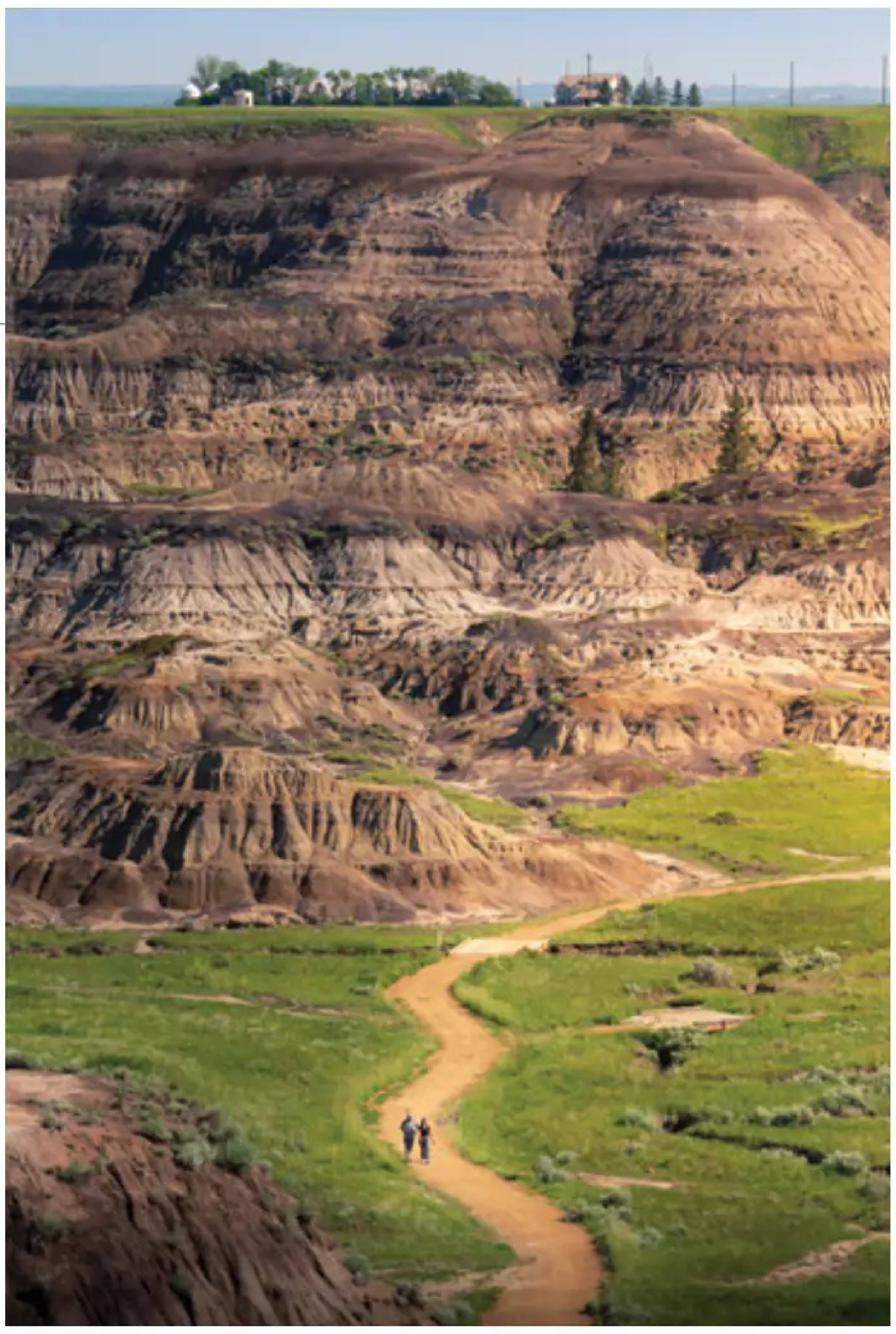
Eli Wolpin
It took 40 minutes and three tanks of air for the photographer to reach this giant Pacific octopus, which laid her eggs in early June in Whytecliff Marine Protected Area, B.C. After laying their eggs, octopus mothers stay in their dens, protecting their young. Eventually, they stop eating, and are often dead by the time the eggs hatch.

Canadian
PHOTOS OF THE YEAR
2024

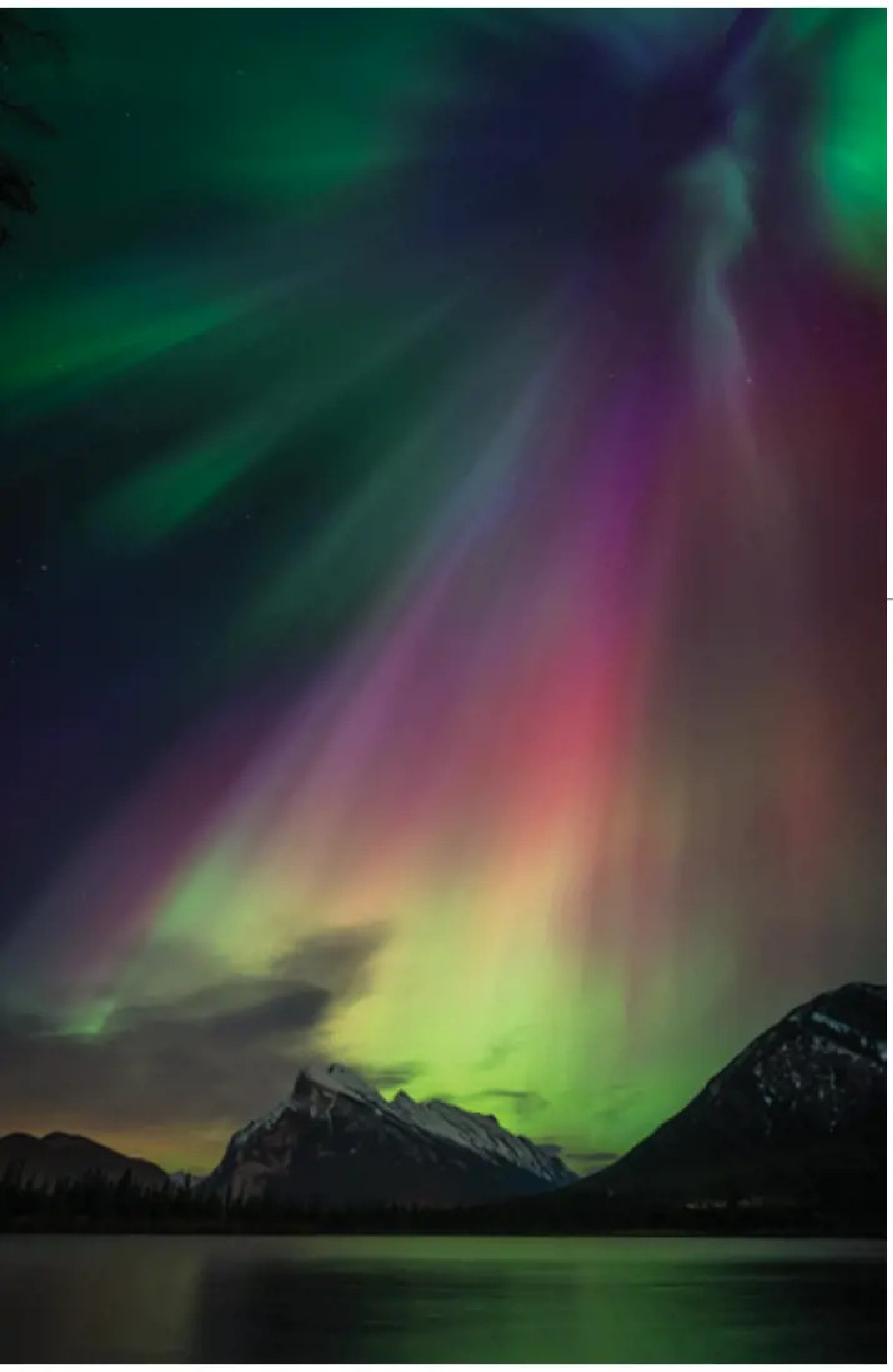
HONOURABLE MENTIONS



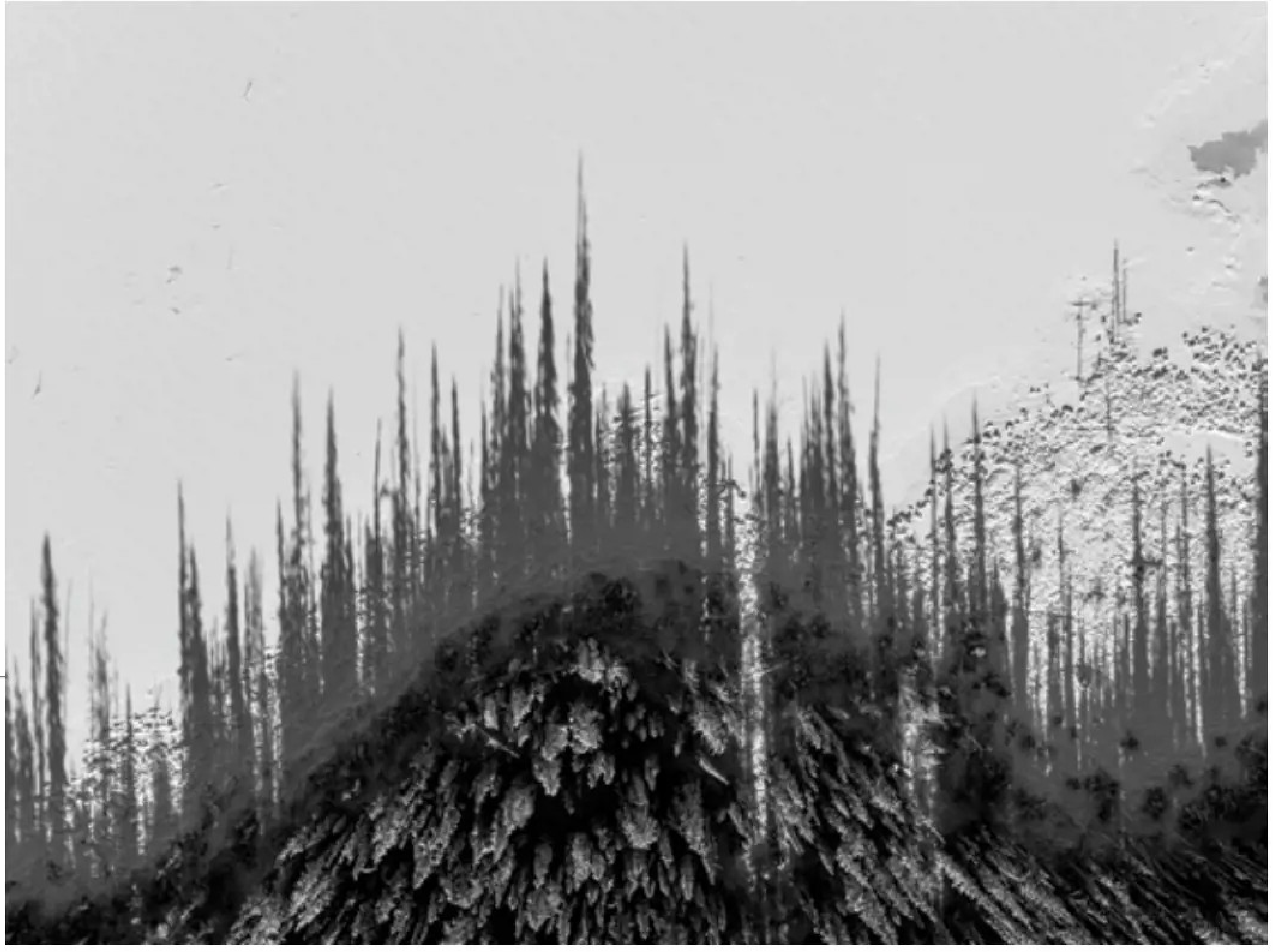
Rain Saulnier
These Atlantic puffins take a break from hunting for fish to have a sunset social near Elliston, N.L.



Oscar Hui
As the morning sun bathes this valley in the Drumheller Badlands, Alta., a lone couple hikes a trail through a landscape shaped by time.



Peter O’Hara
The northern lights dance over Vermillion Lakes in Banff National Park, Alta., as Mount Rundle stands majestic, illuminated in an eerie green glow.



Brandon Broderick
Trees cast their long cold shadows onto the expanse of a frozen lake near Tumbler Ridge, B.C.

Whale Tale Treasures
on line
shopping
TROUT RIVER NL

greatcanadiantrails.com

INSPIRED BY CANADA'S
GREAT OUTDOORS

Marvel at some of Canada's most inspiring landscapes, incredible networks of trails, and stunning national parks.

Choose from a vast selection of innovative **guided and supported self-guided hiking and cycling adventures** and stay at handpicked charming accommodations.

Photo (main) Western Newfoundland | David Gray • Prince Edward Island by bike | Sherry Ott • Hikers in the Yukon | Mark Daffey
Happy day in Banff National Park | Ben Morin

GREAT
CANADIAN TRAILS

Contact our team by phone
1.866.305.2257
or email
info@greatcanadiantrails.com

1% FOR THE PLANET
— MEMBER —

MEMBER
ADVENTURE TRAVEL
TRADE ASSOCIATION

Leave No Trace Canada

tico.ca
Travel Industry Council of Ontario

Retail: 2103152
Wholesale: 50013960

STEPHEN FRY AWARDED LAWRENCE J. BURPEE MEDAL, MADE HONORARY FELLOW

Canada House
La Maison du Canada

Stephen Fry speaks at the event at Canada House in London.

Many titles can be applied to Stephen Fry: actor, writer, conservationist, knight, humorist. Now he can add honorary Fellow of the Royal Canadian Geographical Society.

The distinguished thespian was presented with the Society's Lawrence J. Burpee Medal and an honorary Fellowship at a reception held at Canada House in London on Dec. 3, 2024.

The medal recognizes an outstanding contribution made by an individual that greatly enhances the ability of the RCGS to fulfill its mission of making Canada better known to Canadians and to the world, and also contributes to the general advancement of geography.

Fry was touched by the honour, saying he has fond memories of travelling to Canada to film documentaries.

"Geography is perhaps the most exciting subject that anybody can study," said Fry. "It is the story of our world, the world of Gaia, the origin."

In presenting the medal, RCGS CEO John Geiger also noted that Fry has taken up the mantle of host of *Jeopardy! UK*, and so is an inheritor of the role originated by former Society Honorary President Alex Trebek.

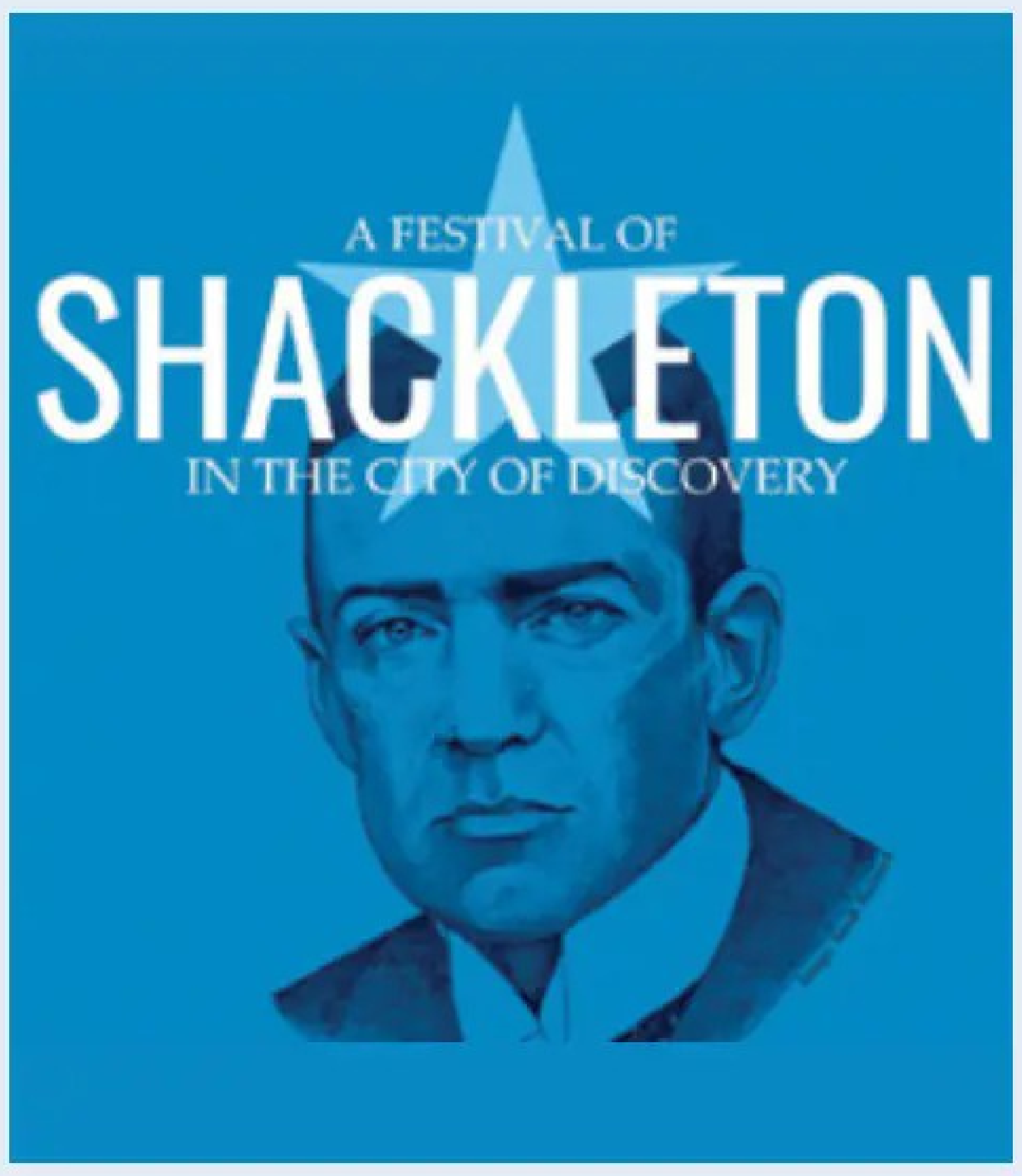
Fry generously donated his time and his voice to the launch of the Trebek Initiative, a granting program jointly established by the National Geographic Society and the RCGS that awards significant funds to individuals or teams embarking on ambitious expeditions and research projects that ignite a passion for Canada.

High Commissioner Hon. Ralph Goodale opened the reception's proceedings, which were attended by Society Fellows including the Hon. Alexandra Shackleton; former Society vice president Wendy Cecil; Joe Smith, current director of the Royal Geographical Society; former RGS director John Hemming; Fram Museum director Geir O. Kløver; David Mearns; Gregory and Pamela Copley; Martin Brooks; historian and author Rafe Heydel-Mankoo; and polar historian Claire Warrior, curator at the National Maritime Museum.

Geiger concluded by saying Fry "recognizes that geography has the power of uniting us in the wonder and appreciation of the beauty of nature, and the glorious diversity of human geography. Thank you, Stephen, for all that you have done for the RCGS, for Canada, and for our world."

LEFT: NOORA VIRTANEN. RIGHT: FESTIVAL OF SHACKLETON

FESTIVAL OF SHACKLETON



THE TWO EXPEDITION leaders responsible for the discovery of two ships commanded by explorer Sir Ernest Shackleton filled a historic concert hall in Dundee, Scotland, on Dec. 5, 2024 during the Festival of Shackleton to celebrate the 150th anniversary of the great explorer's birth.

John Shears, who led the team that found *Endurance* deep in the Weddell Sea, focused on the enormous challenges and teamwork required for the Endurance 22 expedition's triumph in locating Shackleton's legendary ship.

John Geiger, leader of the team that found *Quest* in the Labrador Sea, recounted the fascinating story of Shackleton's final expedition aboard *Quest*, its later years as a seal hunting vessel that sank off the coast of Labrador, and its discovery on June 9, 2024.

Referencing the differences in scale between the highly resourced, multi-million-dollar Endurance 22 expedition and the RCGS's more modest Shackleton Quest Expedition, supported by donors, Geiger expressed his surprise when he discovered he was speaking after Shears. "It's a bit like when Led Zeppelin opened for The Monkees," he said to laughter from the audience of more than 1,000 people.

FEATURED FELLOW: BOB RAMSAY

COURTESY BOB RAMSAY

For more than 40 years, Bob Ramsay's RamsayTalks series has offered a platform for influential leaders and thinkers.

Bob Ramsay is a "proud extrovert and a natural enthusiast." A former advertising copywriter, book editor and speechwriter, and the current head of Ramsay Inc., a Toronto-based communications and marketing firm, Ramsay thrives on connecting with people and sharing ideas. As a champion of community, Ramsay has helped steer Canadian institutions, sitting on the boards of the Toronto International Film Festival, the Women's College Hospital Foundation and others. For more than 40 years, his RamsayTalks series has offered a platform for influential leaders and thinkers. Here, the recipient of the Governor General's Queen Elizabeth II Golden Jubilee Medal and the Royal Canadian Geographical Society's Bernier Medal discusses the importance of connection.

On becoming a writer

It was a teacher who turned me on to writing. I can point to a final exam where I thought, "I'm just going to write the way I want to write." My schoolteacher got back to me the next week and said, "Boy, that was a great final exam you wrote. You can really write." To have a figure like that say I could really write when I was 17 years of age meant the world to me. I just carried on from there, and I took English literature when I went to university. My father, like lots of parents, told me, "Do what you love." So that's what I ended up doing.

On the RamsayTalks speaker series

I had the best job you could ever have out of university: I was a speechwriter for Ontario Premier Bill Davis. But the job wasn't what I thought it was. I had no contact with people and ideas, and ideas and people are my oxygen. One day I had this radical concept: why don't I invite somebody in to speak to us? Since then, I've hosted hundreds of speakers over the last 45 to 50 years. I can still remember the first speaker in 1972 was Grant Farrow, a kidney doctor at Toronto General Hospital. His opening words were, "Seat belt legislation is putting me out of business because nobody's dying on the highways anymore, and I've lost my access to kidneys." And we all were taken aback and went, 'what did this guy just say?' I thought that was an extraordinary thing to say, and I became hooked on doing these events. I love connecting people. To be able to stand up at Koerner Hall [in Toronto] and introduce a speaker makes me pretty happy.

On being called a connector

It's funny because people have called me a connector all my life. For the first 30 years, I would cringe when somebody said that because what I heard was, "He's only a door opener." My view of that changed completely as I got older. And there is proof that people who have strong connections — wide and deep connections — live longer, are less prone to disease, less prone to depression, etcetera. So now I wear that label with great pride.

—Interview by Julia Power

#CANGEOPOLARPLUNGE
BE BOLD.
GO COLD.
DUCIT AMOR PATRIÆ
Are you ready to take the PLUNGE?
MARCH 9, 2025
DONATE NOW
rcgs.org/polarplunge2025
CANADIAN Geographic
ROYAL CANADIAN GEOGRAPHICAL SOCIETY

CANADIAN Geographic

PRESIDENT AND CHIEF EXECUTIVE OFFICER John G. Geiger

EDITOR-IN-CHIEF Alexandra Pope
MANAGING EDITOR Michela Rosano
SENIOR EDITOR Abi Hayward
ASSOCIATE EDITOR Thomas Lundy
DIGITAL AND TRAVEL EDITOR Madigan Cotterill
DIGITAL MARKETING COORDINATOR Kendra Thompson

CONTRIBUTING EDITORS David McGuffin, Alanna Mitchell, Robin Esrock

DIRECTOR, BRAND AND CREATIVE Javier Frutos
CARTOGRAPHER Chris Brackley
GRAPHIC DESIGNERS Iza Valle, Sophia Villamayor
PHOTOGRAPHERS-IN-RESIDENCE Daisy Gilardini, Michelle Valberg, Scott Forsyth

MEDIA SALES DIRECTOR Karen Kahnert, Strategic Content Labs
416-966-0997, karen.kahnert@stjoseph.com
ADVENTURES Lisa Duncan Brown
brown@canadiangeographic.ca

EXECUTIVE VICE-PRESIDENT John Hovland
VICE-PRESIDENT, OPERATIONS AND PUBLISHER Nathalie Cuerrier

SPECIAL ADVISOR TO THE CHIEF EXECUTIVE OFFICER Deborah Apps
DIRECTOR, OFFICE OF THE CHIEF EXECUTIVE OFFICER Riley Schnurr

VICE-PRESIDENT, STRATEGIC PARTNERSHIPS AND EXECUTIVE PRODUCER, CANADIAN GEOGRAPHIC FILMS Tim Joyce
VICE-PRESIDENT, COMMUNICATIONS AND MARKETING Rosemary Thompson
VICE-PRESIDENT, LEARNING AND RECONCILIATION Charlene Bearhead
DIRECTOR OF WATER AND LAND RELATIONS Meredith Brown
ASSOCIATE DIRECTOR, VIDEO Daniel Arian

DIRECTOR OF FINANCE Jean Mignault
ASSOCIATE DIRECTOR, FINANCE Samuel St Jacques
ACCOUNTS PAYABLE/ACCOUNTS RECEIVABLE CLERK Lydia Blackman

PROJECT MANAGER Danica Mohns
PROJECT AND COMMUNICATIONS COORDINATOR Keegan Hoban
PROJECT COORDINATOR Bee Hancock
ADMINISTRATIVE ASSISTANT Darlene Pelletier

Canadian Geographic is published by Canadian Geographic Enterprises on behalf of the Royal Canadian Geographical Society. Subscriptions are $28.50 per year ($55.00 for two years or $79.50 for three years), plus applicable taxes. For addresses in the United States, add $12 per year. For other international addresses, add $25 per year.

SUBSCRIPTIONS AND ALL CUSTOMER SERVICE INQUIRIES
Canadian Geographic c/o KCK Global
PO Box 923, Markham Station Main, Markham, ON L3P 0B8
800-267-0824 Fax: 905-946-1679
canadiangeographic@kckglobal.com
Hours: Mon.-Fri., 9 a.m.-5 p.m. (EDT)

EDITORIAL OFFICE
50 Sussex Drive, Ottawa, ON K1M 2K1
613-745-4629 Fax: 613-744-0947 canadiangeographic.ca

The RCGS acknowledges that its offices are located on the unceded territory of the Algonquin Peoples, who have been guardians of, and in relationship with, these lands for thousands of years. We further acknowledge and recognize that our work reaches across all of the distinct First Nations, Métis Homelands and Inuit Nunangat, and for this we are grateful.

ISSN 0706-2168. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, without the prior written consent of the publisher or a licence from The Canadian Copyright Licensing Agency (Access Copyright). For an Access Copyright licence, visit accesscopyright.ca or call toll-free 800-893-5777.

Return undeliverable items to *Canadian Geographic*, P.O. Box 923, Stn. Main, Markham, ON L3P 0B8

Date of issue: March 2025 Copyright ©2025. All rights reserved.

Funded by the Government of Canada | Financé par le gouvernement du Canada | Canada

Canadian Geographic is a member of Magazines Canada, The Canadian Marketing Association and Vividata. Circulation audited by the Alliance for Audited Media.

Canadian Geographic and design are registered trademarks.
® Marque déposée.

PUBLICATIONS MAIL AGREEMENT #40065618, REGISTRATION #9654, CANADIAN GEOGRAPHIC, 50 Sussex Drive, Ottawa, Ont., K1M 2K1

Canadian Geographic (ISSN No: 0706-2168, USPS No: 22573) Published six times a year (Jan/Feb, Mar/Apr, May/Jun, Jul/Aug, Sep/Oct, Nov/Dec) by Canadian Geographic Enterprises. US Office of Publication in the USA by Asendia USA, 701 Ashland Ave, Folcroft, PA, and additional mailing offices. Periodicals postage paid at Philadelphia, PA. U.S. POSTMASTER: send address changes to *Canadian Geographic*, 701 Ashland Ave, Folcroft PA 19032.

FSC www.fsc.org MIX Paper | Supporting responsible forestry FSC® C103458

ROYAL CANADIAN GEOGRAPHICAL SOCIETY

CHIEF EXECUTIVE OFFICER
John G. Geiger, C.M.

EXECUTIVE VICE-PRESIDENT
John Hovland

VICE-PRESIDENT, OPERATIONS AND PUBLISHER
Nathalie Cuerrier

DIRECTOR, OFFICE OF THE CHIEF EXECUTIVE OFFICER
Riley Schnurr

DONOR RELATIONS ASSOCIATE
Laura Cooper

VICE-PRESIDENT, FACILITIES
Mike Elston

BUILDING CARETAKER
Mike Marshall

DIRECTOR OF FINANCE
Jean Mignault

VICE-PRESIDENT, LEARNING AND RECONCILIATION
Charlene Bearhead

DIRECTOR, SOCIETY PROGRAMS
Sandy Couto

DIRECTOR, STORYTELLING AND PARTNERSHIPS
Dan Mullen

DIRECTOR OF RESEARCH AND EDUCATION
Michelle Chaput

EDUCATION PROGRAM COORDINATORS
Eric Nadeau, Dominique Patnaik, Mitchell Taylor

INDIGENOUS EDUCATION FELLOW
Chloe Bluebird Mustooch

BIINAAGAMI EDITORIAL AND EDUCATION COORDINATOR
Katie Doreen

Founded in 1929, the Society is a non-profit educational organization. Its objective is to advance geographical knowledge and, in particular, to stimulate awareness of the significance of geography in Canada's development, well-being and culture. In short, the aim is to make Canada better known to Canadians and to the world.

Donate to the RCGS **613-745-4629** or **rcgs.org/donate**

PATRON
Her Excellency the Right Hon. Mary Simon, C.C., C.M.M., C.O.M., O.Q., C.D., Governor General and Commander-in-Chief of Canada

VICE-PATRONS
Sir Christopher Ondaatje, O.C., C.B.E.
Lord Martin Rees, O.M.
Hon. Margaret M. Thom, O.N.W.T.

HONORARY PRESIDENT
Chief Perry Bellegarde, S.O.M.

HONORARY VICE-PRESIDENTS
Roberta Bondar, O.C., O.Ont.
Arthur E. Collin
Wade Davis, C.M.
Gisèle Jacob
Denis A. St-Onge, O.C.
Joseph MacInnis, C.M., O.Ont.

EXPLORERS-IN-RESIDENCE
Emily Choy, Jill Heinerth, George Kourounis, Mylène Paquette, Mario Rigby, Adam Shoalts (Westaway Explorer-In-Residence), Ray Zahab

PRESIDENT
Hon. Lois Mitchell, C.M., A.O.E., Calgary

VICE-PRESIDENTS
Joseph Frey, C.D., Toronto
Connie Wyatt Anderson, The Pas, Man.

SECRETARY
Carl Gauthier, M.M.M., C.D., Ottawa

TREASURER
Jim Carter, CPA, C.D. Lethbridge, Alta.

IMMEDIATE PAST PRESIDENT
Gavin Fitch, K.C., Calgary

GOVERNORS
Mark Gallop, Trois-Ruisseaux, N.B.
Nellie Kusugak, O.Nu., Rankin Inlet
Akaash Maharaj, Ottawa
Christopher P. McCreery, M.V.O., Halifax
Antoine Normandin, Ottawa
Zac Robinson, Edmonton

COMING UP

THRILL OF THE CHASE

When supercell thunderstorms bubble up over the Great Plains in spring and summer, Calgary-based scientist and inventor Mark Simpson and Team Dominator are there to document, research and educate the public. In the May/June issue, writer Alanna Mitchell rides along with Team Dominator on an adrenaline-pumping chase.

Canadian Geographic Kids
AWESOME ANIMAL FACTS
200 AMAZING PHOTOS
QUIZZES, GAMES and much more!

AWESOME ANIMAL FACTS

What's the largest bear species in Canada? How long can loons hold their breath? Find these answers and more in *Awesome Animal Facts*, *Can Geo*'s first children's book. With stunning photography plus challenging games and quizzes, you won't want to miss this when it hits bookstores across Canada on April 15.

BREATHING LANDS

In northern Ontario, the proposed Mushkegowuk National Marine Conservation Area would protect waters shared by polar bears and belugas, as well as vital coastal wetlands. In an upcoming issue, join writer Susan Nerberg and photographer Christian Fleury as they explore this region and the efforts of Cree First Nations, who are working alongside Parks Canada to protect this marine environment for generations to come.

THIS MUST BE THE PLACE

Sometimes we uncover the most fascinating scientific discoveries when we're not looking for them. Places like the Algonquin Wildlife Research Station in Algonquin Provincial Park, Ont., set the stage for any number of "right place, right time" discoveries. Featuring photography of the park's iconic wildlife, explore the people and science that put this station on the map. Watch for it in the next issue.

Subscribe or renew today at canadiangeographic.ca/subscribe or by calling 1-800-267-0824. The May/June 2025 issue hits newsstands on April 14.

CLOCKWISE FROM TOP LEFT: LEAH HENNEL; SUTHERLAND HOUSE BOOKS; SAMANTHA STEPHENS; CHRISTIAN FLEURY

PHOTO BY KATIE GOLDIE

STILL TIME TO BOOK

CMH
HELI✦SUMMER

THE ULTIMATE CANVAS

HIKE AND LEARN WITH CANADIAN GEOGRAPHIC AMBASSADORS

Step into British Columbia's wild beauty with your camera or paintbrush on this 4-day luxury hiking trip. With heli-access to remote trails, gourmet meals, and guidance from Canadian Geographic ambassadors, this adventure will inspire your creativity. Hone your craft in the ultimate outdoor classroom. Spots are limited—act now.

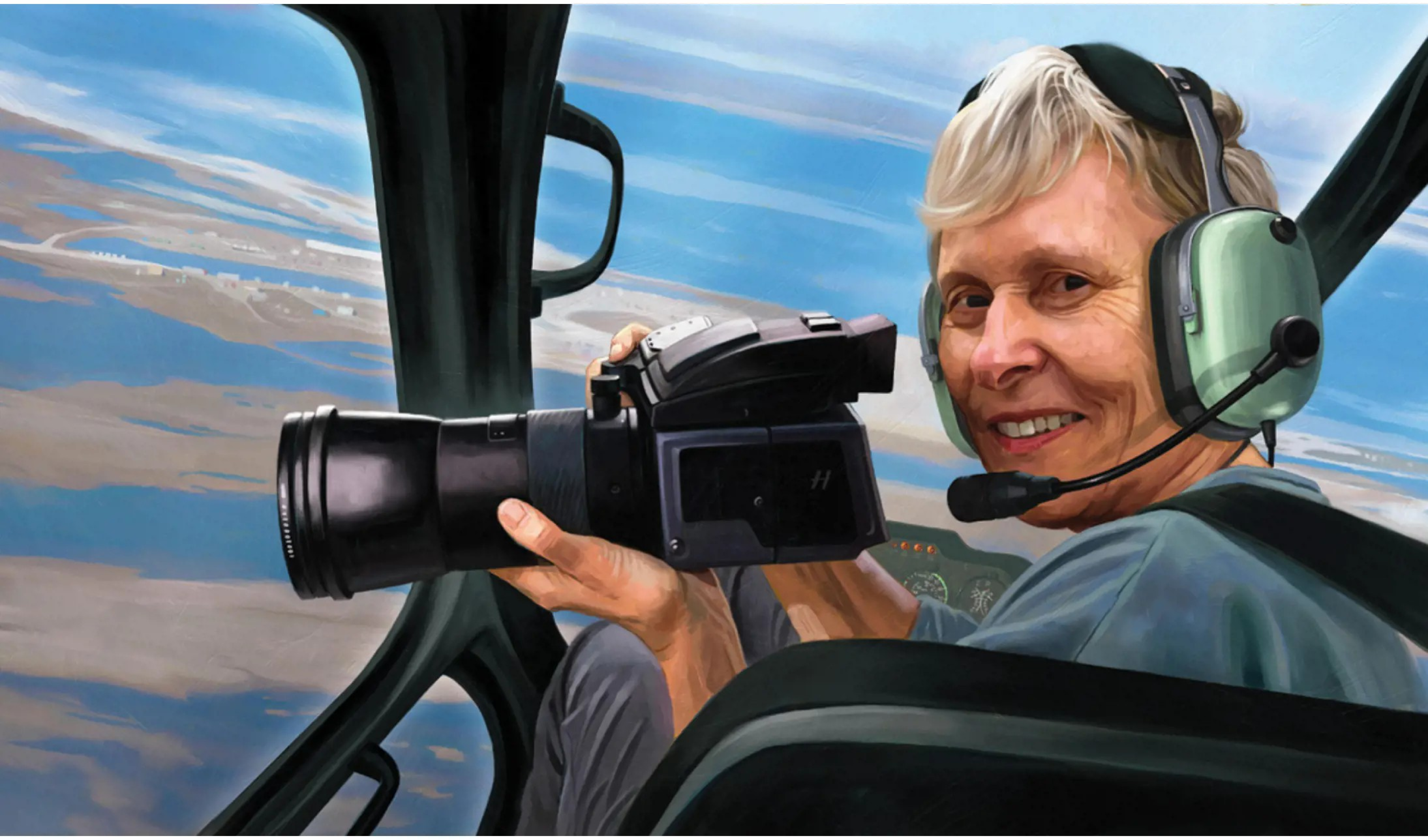
July 17-20, 2025 (4 days, 3 nights)
at CMH Bobbie Burns Lodge

DAISY GILARDINI, PHOTOGRAPHER
DAVID MCEOWN, PAINTER

DON'T LET SUMMER PASS YOU BY
CALL **1-800-661-0252** OR VISIT **CMHSUMMER.COM**

Canadian Geographic ADVENTURES

DESIGNATED TRAVEL PARTNER



Roberta Bondar

The first Canadian woman in space on the wonder of seeing Canada from the seat of a helicopter

Right now, my favourite place to be is in a helicopter with my camera, gliding over Canada — from tundra to prairies to temperate rainforests. They're places I *thought* I knew or that I hadn't been able to get to. Recently, I flew over Southampton Island, one of the most southern islands of the Arctic Archipelago, following endangered and near-threatened birds, such as the red knot, that nest on the island. To soar over this magnificent terrain, observing its striking sculpted edges that spill out into Hudson Bay, and understanding that this is part of the country very few people get to see, was indescribable.

The idea that there is a different perspective to life is an important one. It's about trying to grasp what a person's history is on the planet at a particular time, while understanding that the natural environment is something that's been here long before us. When I was in space and saw the edge of the Earth contrast with the black universe, it had a huge impact on me. That's why, since my space flight, I look for clear horizons on the surface of this planet, like the prairies or the Arctic. When we look at our country from above, everything suddenly feels so important, because we are seeing the interface between the universe above and the planet below.

For me, what's most special about this country is appreciating that life on the surface of this planet has been there for hundreds of thousands of years. It's that kind of permanence that humbles me.

—as told to Samantha Pope

Southampton Island, known as Salliq (ᓴᓪᓚᖅ) in Inuktitut, is in the Kivalliq region of Nunavut in Inuit Nunangat.

ROBERT CARTER

A legacy that
lasts *forever?*

Nature makes it possible.

It's a big promise but it's true. When you include the Nature Conservancy of Canada in your Will, you ensure Canada's priceless landscapes and species are protected – for everyone, forever.

Order your Free Legacy Information Booklet today!

Call Jackie at 1.877.231.3552 x2
or visit naturelegacy.ca

NATURE
CONSERVANCY
CANADA

NEW SECRETS OF ANCIENT EGYPT – GROUNDBREAKING DISCOVERIES

A ROYAL EVENING WITH DR. ZAHI HAWASS

THE WORLD'S MOST FAMOUS ARCHAEOLOGIST

EVENT of the YEAR!

USA & CANADA GRAND LECTURE TOUR
MAY – AUGUST 2025

THE LOST PYRAMID • MISSING ROYAL TOMBS • NEW FINDS AT THE VALLEY OF THE KINGS • PROGRESS IN THE GOLDEN CITY

THE SEARCH FOR CLEOPATRA'S TOMB • SECRET ROOMS IN THE GREAT PYRAMID • KING TUT'S UNTOLD SECRETS • & MORE REVELATIONS!

Discover the greatest secrets of the Land of the Pharaohs! The time has come for the legendary Dr. Zahi Hawass to unveil ancient Egyptian mysteries that were lost for millennia.

The real-life Indiana Jones returns to North America to share the latest discoveries, reveal groundbreaking finds drawn from his most recent excavations and make the most thrilling announcements of his remarkable career. **This event will make history – live on stage – and you won't want to miss it!**

Join Dr. Hawass for a captivating all-new multimedia presentation prepared exclusively for this historic tour. Stay after the lecture for a Q&A session and a book signing.

Seats are limited – Register now

www.ZahiLectures.com
contact@zahilectures.com
+1 646-757-1717

May 1	Phoenix, AZ
May 3	Los Angeles, CA
May 6	San Diego, CA
May 9	Las Vegas, NV
May 11	Oakland, CA
May 14	Portland, OR
May 18	Seattle, WA
May 22	Denver, CO
May 25	Austin, TX
May 27	Oklahoma City, OK
May 29	Dallas, TX
June 1	New Orleans, LA
June 5	Tampa, FL
June 7	Orlando, FL
June 11	Nashville, TN
June 14	Atlanta, GA
June 16	St. Louis, MO
June 18	Charlotte, NC
June 21	Pittsburgh, PA
June 25	Columbus, OH
June 28	Chicago, IL
June 30	Minneapolis, MN
July 3	Cleveland, OH
July 6	Indianapolis, IN
July 9	Boston, MA
July 12	Baltimore, MD
July 16	Virginia Beach, VA
July 19	New York, NY
July 21	Philadelphia, PA
July 23	Washington, DC
July 26	Vancouver, BC – Canada
July 30	Toronto, ON – Canada
August 2	Montreal, QC – Canada